THE EFFECT OF TUYERE VELOCITY ON CUPOLA MELTING PERFORMANCE

CONTRACT REPORT NO. 0SQ82-00136

DSS FILE NO.: 26SQ.23440-2-9074

COMPLETE FIELD DATA PACKAGE

March 28, 1983

204 pp

HATCH ASSOCIATES LTD.
Consulting Engineers • Ingénieurs Conseils

MICROMEDIA

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HATCH ASSOCIATES LTD.

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SECTION 'A': DESCRIPTION OF MARCH 25, 1983 TESTWORK

- General Observations
- Location of Porthole #5
- Comparison of Data for Porthole #5

HATCH ASSOCIATES CONSULTING ENGINEERS	CALCULATION SHEET		SHEET NO. SECTION A .... OF ....
DESCRIPTION KELSEY - HAYES	PROJ. NO. 9003	MADE BY SK DATE MAR/83	CHECKED BY DATE

MAR. 25 TESTWORK

TUYERE OPENINGS = 8 x 3½" x 6" (HALF OF OPENINGS BLANKED, OTHERS FULLY OPEN)
TUYERE VELOCITY = 90 SFPS

OPERATION WITH REDUCED COKE RATE, GRAPHITE INJECTION. LIMESTONE CHARGE INCREASED TO 80 lb. (FROM 60 lb.)

MORNING TESTS : METAL LOADED FIRST INTO BUCKET FOLLOWED BY A MIXTURE OF COKE AND LIMESTONE

AFTERNOON TESTS : REVERSED CHARGING ORDER. MIXTURE OF COKE AND LIMESTONE LOADED FIRST.

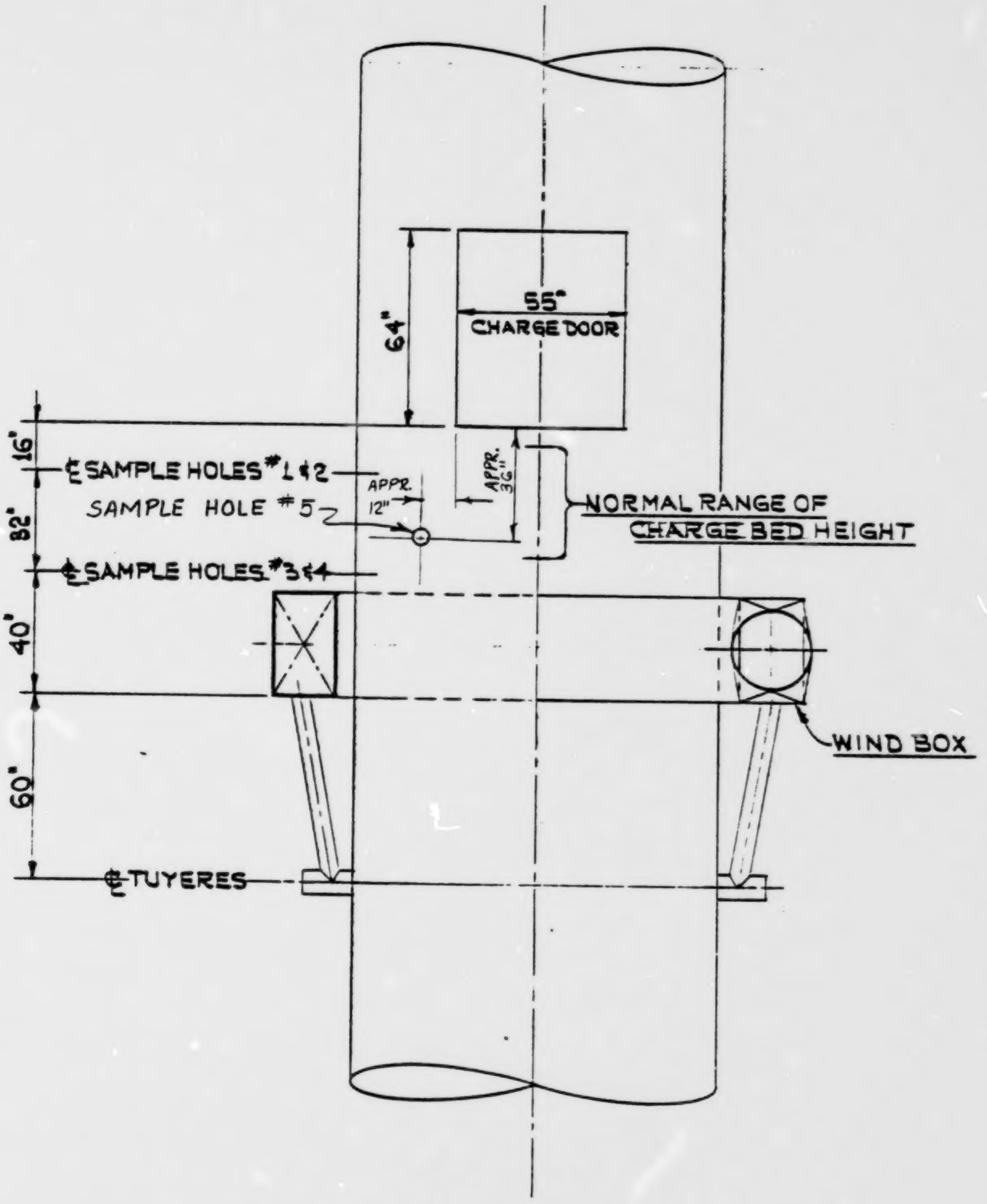
ALL TUYERE DAMPERS OPEN

THERE WAS NO HORIZONTAL SEGREGATION OF CHARGE IN THE BUCKET.

DUE TO SAFETY CONCERNS, ANY POSSIBLE SEGREGATION OF THE CHARGE WITHIN THE CUPOLA COULD NOT BE OBSERVED.

GAS SAMPLES WERE TAKEN THROUGH A FIFTH PORTHOLE LOCATED BELOW CHARGE DOOR (SEE ATTACHED FIGURE)

A TABLE IS ATTACHED COMPARING THE GAS COMPOSITION THROUGH No. 5 PORTHOLE WITH THE AVERAGE OF THE OTHER PORTHOLES AND No. 4 PORTHOLE (DIAMETRICALLY OPPOSITE)



ELEVATION

CUPOLA #8

HATCH ASSOCIATES LTD. Consulting Engineers		DWG. NO.
LOCATION OF SAMPLE HOLES		

HATCH ASSOCIATES CONSULTING ENGINEERS	CALCULATION SHEET		SHEET NO. .... OF.......
DESCRIPTION KELSEY-HAYES	PROJ. NO. 9003	MADE BY SK DATE MAR 28/83	CHECKED BY DATE

COMPARISON OF MAR. 25 DATA FOR No. 5 PORT

a) MORNING (NORMAL CHARGE ORDER WITH METAL ON BOTTOM):

	CO_2	CO	O_2
Avg. of Port #1-4	11.0 %	18.6 %	0.2 %
Port #4	10.8	17.3	0.6
Port #5	13.7	15.4	0.1
Difference (avg. of #1-4 - Port #5)	-2.7	3.2	0.1
Difference (Port #4 - Port #5)	-2.9	1.9	0.5

b) AFTERNOON (REVERSED CHARGING WITH COKE ON BOTTOM):

	CO_2	CO	O_2
Avg. of Port #1-4	13.0 %	12.5 %	0.5 %
Port #4	12.1	13.0	0.3
Port #5	13.8	13.4	0.0
Difference (avg. of #1-4 - Port #5)	-0.8	-0.9	0.5
Difference (Port #4 - Port #5)	-1.7	-0.4	0.3

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SECTION 'B': SUPPLEMENTARY CALCULATIONS FOR MELTING RATE, METAL: COKE RATIO, METAL CARBON

HATCH ASSOCIATES CONSULTING ENGINEERS	CALCULATION SHEET		SHEET NO. 1 OF 2
DESCRIPTION KELSEY-HAYES SUPPLEMENTARY CALCULATIONS	PROJ. NO. 9003	MADE BY SK MAR 1/83 DATE	CHECKED BY DATE

SUPPLEMENTARY CALCULATIONS FOR:

i) MELTING RATE (tons/op. h)
ii) C IN METAL (%)
iii) C.E. IN METAL (%)
iv) METAL : COKE RATIO

PREVIOUS CALCULATIONS USED DATA FOR ENTIRE SHIFT, NOT JUST THE TESTING PERIOD WITHIN SHIFT. DO SUPPLEMENTARY CALCULATIONS TO REFLECT ACTUAL TEST PERIOD.

NOW CALCULATE VALUES

- FOR C IN METAL & C.E. FOR TEST PERIOD ONLY
- FOR METAL & COKE CHARGES BY TAKING DATA ~HALF HR. BEFORE START OF TEST PERIOD TO ~HALF HR. BEFORE END OF TEST PERIOD (ie. ASSUME 1/2 HR. RESIDENCE TIME & NO ACCUMULATION OF CHARGE MATL.)

NOTE - FOR SOME DATA, NEAR BEGINNING OF SHIFT, CHARGING DOES NOT START 1/2 HR. BEFORE TEST PERIOD, BUT THAT TIME IS STILL USED FOR CALCULATING CHARGE PERIOD

DO CALCULATIONS FOR ALL DATA

BY COMPARING THE SUPPLEMENTARY CALCULATIONS WITH VALUES PREVIOUSLY TABULATED, NO CLEAR TREND IS OBSERVED.

HATCH ASSOCIATES
CONSULTING ENGINEERS

CALCULATION SHEET

DESCRIPTION: KELSEY-HAYES SUPPLEMENTARY CALCULATIONS

PROJ. NO. 9003

MADE BY SK DATE MAR /83

CHECKED BY

DATE

DATE	SHIFT	C IN METAL (%)	C.E. IN METAL (%)	OPER. HRS.	METAL CHARGED (t)	COKE CHARGED (t)	METAL / COKE	MELT. RATE (t/hr.)
DEC. 2	DAY	–	–	3 1/3	48.0	6.5	7.38	14.4
DEC. 6	DAY	3.27	3.87	1 1/12	15.2	2.0	7.60	14.0
DEC. 6	NIGHT	3.30	3.96	1 2/3	20.0	2.50	8.00	11.98
DEC. 8	DAY	3.24	3.85	2.42	44.8	5.82	7.70	18.51
DEC. 22	DAY	3.24	3.83	2 1/3	36.0	5.03	7.16	15.43
DEC. 22	NIGHT	3.24	3.84	1 2/3	22.4	3.24	6.91	13.41
JAN. 10	DAY	3.15	3.77	2	32.8	4.70	6.98	16.40
JAN. 10	NIGHT	3.15	3.78	1 2/3	22.4	3.38	6.63	13.41
JAN. 19	DAY	3.11	3.73	3 2/3	48.0	6.99	6.87	13.08
JAN. 19	NIGHT	3.11	3.72	1 1/3	18.4	2.73	6.74	13.80
JAN. 21	DAY	3.14	3.73	3 1/3	44.8	6.00	7.47	13.44
JAN. 21	NIGHT	3.18	3.82	2 1/3	28.8	4.08	7.06	12.34
JAN. 28	DAY	3.24	3.86	2 1/3	24.8	3.71	6.68	10.63
JAN. 28	NIGHT	3.19	3.77	2 1/3	28.8	4.16	6.92	12.34
FEB 1	DAY	3.20	3.80	2 1/3	29.6	4.12	7.18	12.69
FEB 1	NIGHT	3.44	4.05	2	23.2	3.19	7.27	11.60
FEB. 11	DAY	3.43	3.95	2	26.4	3.77	7.01	13.20
FEB. 11	NIGHT	3.29	3.88	1 1/3	16.8	2.41	6.99	12.60
FEB. 17	DAY	3.32	3.95	1 2/3	25.6	3.40	7.53	15.36
FEB. 17	NIGHT	3.28	3.88	1 2/3	17.6	2.82	6.24	10.56
MAR 23	MORN	3.27	3.87	1 2/3	19.2	2.48	7.74	11.52
MAR 23	AFT	3.12	3.73	1	15.2	2.20	6.92	15.2
MAR 25	MORN	3.23	3.86	3	45.6	5.90	7.73	15.2
MAR 25	AFT	3.18	3.79	1 1/4	19.2	2.50	7.68	15.36

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SECTION 'C': DATA SHEETS FOR GROUP I TESTS
(BASE CASE, TUYERE VELOCITY = 45 SFPS)

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Dec. 2nd, 1982

Barometric Pressure [illegible] "Hg Dry Bulb Temperature [illegible] Wet Bulb Temperature [illegible]

Operating Conditions:

O_2 Addition: 100 SCFM

Blast Air Temp 69°F

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
8:30	10.5	—	10.[illegible]	[illegible]	—	-	9.5	—	[illegible]	—	47				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11.[illegible]	—	—	—	[illegible]	1.40	46½				
[illegible]		—	7.5	—	—	-	[illegible]	—	[illegible]	—	—	4	9.4	14.4	[illegible]
[illegible]	10.0	595	7.5	[illegible]	[illegible]	-	-	—	[illegible]	1.50	45				
9:50	12.0	—	11.5	—	—	-	[illegible]	—	2781	—	—				
10:10		[illegible]	—	[illegible]	—	-	-	-	2814	[illegible]	[illegible]				
[illegible]	9.5	[illegible]*	11.[illegible]	[illegible]	[illegible]	-	[illegible]	-	[illegible]	[illegible]	[illegible]				
[illegible]	8.5	761	[illegible]	[illegible]	[illegible]	[illegible]	—	-	2819	1.65	—	[illegible]	[illegible]	[illegible]	
11:10	9.0	750	11.5	[illegible]	—	-	7.5	-	2781	1.65	42	1	[illegible]		
[illegible]	8.5	[illegible]	11.5	[illegible]	6.0	-	-	-	[illegible]	—	—				
[illegible]	9.0	[illegible]	8.0	[illegible]	—	-	7.5	-	2761	1.65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
$\bar{x}$	10.0	705	10.4	690	8.7	862*	7.7	—	2785	1.564	43.3	—	—	—	—

* [illegible]

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 2/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan Briquets Red
Bed 6:26	190	400/60	—	450	—	450	300	400	5	1
6:27										
6:32										
6:35										
6:38										
6:52										
6:55										
7:00										
7:05										
7:09										
7:13										
7:16	[illegible]									
7:20										
7:25	[illegible]									
7:29										
7:38										
7:41		100		100 Stone						
7:45										
7:48										
7:54	210 (circled)				20 Mc Coll called.				(6)	
7:57	410									
8:01				Silicon Brick called.						
8:07					200 Coke					
8:10										
8:13										
8:16										
8:18										
TOTAL 8:22		100		100 Stone						

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 27/82 MELTER Cupola #3

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manga... Briq... Re...
Bed										
1 25	410	100	—	450	—	450	300	400	6	
2 27						1 Extra Manganese				
3 30						for 10 Charges.				
4 32										
5 35	[illegible]									
6 40										
7 43										
8 46										
9 49										
10 52										
11 55	Full									
12 [illegible]										
13 14										
14 17										
15 10										
16 13	[illegible]									
17 1[illegible]										
18 22										
19 25										
20 29										
21 31										
22 35	Full									
23 43										
24 4[illegible]										
25 51										
26 54	410				200 Coke					
27 56										
TOTAL		100			100 [illegible]					

TOTAL MELT .... TOTAL COST ....

WFSL - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 2/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manga... Briq...
Bed 10 03	210	60	—	450	—	450	300	400	6	1
10 06										
10 04										
10 12										
10 15										
10 17										
10 20										
10 23										
10 26										
10 30										
10 32	[illegible]									
10 35	[illegible]									
10 40										
10 43										
10 46										
10 49	Full									
10 52										
10 57										
11 00		160		100 Limestone						
11 04										
11 07										
11 11										
11 14	410			200 Coke.						
11 17										
11 20										
11 23										
11 26										
TOTAL 11 29										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

DATE Dec 2 /1982 MELTER [illegible] SHIFT #1

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges (34)		Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Mang. Briq.
Bed		900									
1	11 33		60								
2	11 39				450		450	400	400	6	1
3	11 43										
4	11 47 ←										
5	11 50	410									
6	11 53				2 – Coke						
7	11 56										
8	11 57										
9	12 02										
10	12 07										
11	12 12										
12	12 16										
13	12 [illegible]			[illegible]			Brick			(6)	
14	12 [illegible]										
15	12 27										
16	12 30										
17	12 34										
18	12 36										
19	12 [illegible]										
20	12 42										
21	12 45	[illegible]									
22	12 48	[illegible]									
23	12 [illegible]										
24	12 [illegible]										
25	[illegible]										
26	1 07										
27	1 10										
TOTAL	[illegible]										

WP&L - 252 TOTAL MELT .... TOTAL COST ....

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 2/82 MELTER [illegible] #8

Wind On ______ A.M. Furnace Dropped ______ P.M. Pressure ______ Ounces Volume ______ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manga… Briqu… Re…
Bed										
147	210	60	—	450	[illegible]	450	300	400	5	/
120										
184										
186										
189										
182										
135										
138										
140										
10 144	[illegible]									
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT ______ TOTAL COST ______

WP&L - 252

CUPOLA REPORT

CUPOLA No: 8 DATE: Dec 2-82 SHIFT: Days

Bed - 62"
Sand: ... lb.
Coke: 6700 lb.
Lime: 400 lb.

Ozon all day
35 x 11"
35 x 9"
4 cokes helspot

Start -
Lit: ... a.m.
Charge: ... a.m.
Blast: 650 a.m.
Tap: 702 a.m.
Slag: 730 a.m.

Stop -
Charge: 144 p.m.
Blast: 230 p.m.
Drop: 240 p.m.

Meltzona: 5400 lb.
Charges: 122 tons
Poured: ... tons
Hours Melted: ... hrs.
Tons per hour: ... tons
Cupola Loss: ... %
Coke Ratio: ... TO
Weather: ...
Humidity: ... %
Temperature: ... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
650			30	70	O2 on full.						
7			30	70	11 TON	12			19	68	
10			24	64		10			19	68	
20			24	63	13 TON	20			20	68	
30			24	64		30			19	68	25 TON
40			24	64		40			18	68	
50			24	65		50			18	68	
8			24	66	12 TON	1			18	68	
10			24	66		10			18	68	
20			24	66		20			18	68	
30			24	66		30			18	68	
40			24	68		40		X	18	68	26 TON
50			24	68		50	[illegible]				
9			25	65		2	X				
10			25	65		10			18	68	
20			25	66		20			10	61	
30			25	66	15 TON	30	–	X	9	61	
40			24	68		40					
50			24	68		50					
10			24	68		3					
10			24	67		10					
20			24	68		20					
30			24	68		30					
40			24	68		40					
50			30	68		50					
11			30	68	15 TON						
10			30	68		10					
20			30	68		20					
30			30	68		30					
40			30	68		40					
50			30	68		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 140. lbs.
		TRANSFER LADLES	Fe Si. 85% 100 lbs.
	Ø	33 Prime 7 [illegible]	
		1A65R	Cupola Tender [illegible]

WPL 236

TIME	T.C.	Si	C.E.	Graphite Dial	Silicon Dial	T.C.	Si	C.E.	Silicon Add	Graphite Add	Test Bars, e.t. R. 190 Co 5 sil
7 00			Dec. 2	2							
10											
20					70	328	181	388			
30	348	171	405	98							
40						327	185	3.89			100 stone
50						345	179	405	400 floor		200 Coke
8 00	336	152.	387	98	40	345	189	408	200 floor		R-200 Coke
10											R. 6 [illegible]
20	317	169	373	98	40	339	176	398			200 Coke
30											
40	345	174	383	98	40	349	175	407			100 stone
50						349/353	195/179	414/413	200 TB	400 TB	
9 00	331	183	392	98	30	345	176	404			
10	325	180									
20	~~347~~	18	388	98	20	347	186	409			200 Coke
30											
40	329	187	391	98	20.	351	186	413			
50											
10 00	323	186	365	98	20	342	188	405			200 Coke
10											100 stone
20	320	199	386	98	20	341	185	403			
30											
40	327	187	389	98	20	341	183	402			
50											
11 00	343	185	408	98	20.	354	186	416.			
10											100 stone
20	315	167	371	98	20	352	187	414			200 Coke
30											
40	326	186	388	98	16.	346	188	409			
50											
12 00	313	186	375	98	16.	341	195	406.			200 Coke
10											
20	330	203	398	98	16						R 5 sil bu
30											
40	333	200	400	98	[illegible]	350	198	416.			
50											
1 00	325	183	386	98	[illegible]	342	196	407			
10											
20	353	199	419	98	[illegible]	348	199	414			
30											
40	323	186	385	98	[illegible]	342	195	407			
50											
2 00											
10				98	[illegible]	342	195	407			
20	317	173	375	98	[illegible]	339	196	404			
30						348	192	412			
40											
50						345	191	405			
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Dec 6, 1982 A.M.

Barometric Pressure 29.35 Dry Bulb Temperature 48°F Wet Bulb Temperature 45°F

Operating Conditions: Normal BLAST AIR 74.5

O_2 Addition: 100 SCFM

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
8:30	9.5	685	12.5	650	11.0				2750	1.4	43¼				
8:50	9.0	671	14.0	725	—		9.5		2708	1.6	38				
9:10	8.0	775	—		9.5				2834	1.6	37¼	#2	10.5	—	—
9:20 9:35	Blower off Blower on				—										
9:50	11.0	585	13.5	646	—		9.5		2849	1.7	36	#1 #3	13.4 9.2	1.0 .2	8.6 13.4
10:10	10.0	686	12.0	607	10.0		—		2822	1.65	35¼				
10:30	11.5	766		731	—		12.0		2822	1.7	38¼	#1 #4	10.8 8.0	0 .4	14.2 12.[illegible]
10:45 11:10	Blower off Blower on														
11:20	11.5			546	11.0										
	Holding Furnace Full Cupola Commencing Intermittent Operation														
AVG. 9:10-10:30	10.1	703	12.8	661	9.8	—	10.8		2832 2798	1.66	36.7	AVG UPPER AVG LOWER	11.6 8.6	.5 .3	11.4 13.0

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 6/82 MELTER Cupola #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 6:35	190	400/160	—	450	—	450	300	400	5'	1
6:38										
6:42										
6:45										
6:48	Full									
7:02										
7:05										
7:09										
7:13										
7:17	Full									
7:22										
7:27										
7:31		160			100 Stone					
7:34										
7:37										
7:41										
7:45	370				200 Coke					
7:49										
7:53										
7:55	Full									
8:04										
8:06										
8:10										
8:12										
8:15										
8:20										
8:24	370				200 Coke					
TOTAL 8:28										

TOTAL MELT ________ TOTAL COST ________

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 6/82 MELTER [illegible] # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan Brique Red
Bed										
1 32	190	60	—	450	—	450	300	400	5	1
2 37										
3 40										
4 43	[illegible]		[illegible]							
5 50	(200)	[illegible]		[illegible]						
6 64	200				200 Extra Coke					
7 00										
9 04										
9 07										
9 10	190(?)									
9 14										
9 30	[illegible]	160			100 – [illegible]					
9 33										
9 36										
9 37										
9 41										
9 44										
9 46										
9 49										
9 53	[illegible]									
9 57										
(22) 04										
(23) 08	400				200 Coke					
(24) 11										
(25) 14										
(26) 1[illegible]										
(27) 2[illegible]										
TOTAL		2			12 [illegible]					

50.9

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 6/82. MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Mangan Briqu Red
56										
Bed										
10:28	200	2	~~[illegible]~~	450	—	450	300	400	5	1
10:31		2								
10:34		2								
10:40		2								
11:09		2								
11:12	400				200 Coke					
11:15										
11:18										
11:21										
11:24										
11:27										
11:30		Shut Down								
12:45										
12:48										
12:50										
12:53	400			200 Coke						
12:55										
12:58										
1:02										
1:05										
1:10										
1:13		160		100 Stone						
2:07										
2:10	400			200 Coke						
2:13		Shut Down 160		100 Stone						
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

CUPOLA REPORT

CUPOLA No: 8 DATE: Dec 6/82 SHIFT: Day

Bed – 63
Sand: .... lb.
Coke: 5,400 lb.
Lime: .... lb.

12 Cans Carbide.
35 1" 4 Bag Feldspar
35 9"
0 Iron all day.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: 6:51 a.m.
Tap: 7:07 a.m.
Slag: 7:35. a.m.

Stop –
Charge: .... p.m.
Blast: .... p.m.
Drop: .... p.m.

Meltzone: 5500 lb.
Charges: 81 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: 3 hr 40 min.
Coke Ratio: .... TO

Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			26	69		12	1 hr.				
10			27	64		10	15 mins				
20			27	64	12 TON	20					
30			27	62		30					
40			27	62		40	X				
50			27	62		50			18	68	
8			27	62		1			18	69	
10			24	62		10		X	20	68	
20			22	62		20					26 TON
30			22	62		30	55				
40		X	21	63		40	mins				
50	X	5 mins.			Burner off.	50					
9			21	64	20 TON	2					22 Ton
10			21	64		10	X	X	15	68	
20	15 mins	X			Clean tuyeres	20					
30	X		21	66		30	45 Mins				
40			21	66		40					17 Ton
50			21	66		50					
10			19	66		3					
10			19	66		10					
20			20	66		20					
30			20	66		30					
40		X	21	66	After burners off	40					
50	25 mins				26 TON	50					
11											
10	X		20	66		10					
20			20	69		20					
30		X	20	69		30					
40					Clean tuyeres	40					
50						50					

Type of Drum	Cans of Alloy	SPOUT / TRANSFER LADLES	
		SPOUT	Fe Si. 85% 100 lbs.
		TRANSFER LADLES	Fe Si. 85% 80 lbs.
		Prime 19	SPEER 6 A6 SR-0
			Cupola Tender [signature]

WPL 236

IRON CONTROL REPORT

Jim [illegible] [illegible]

DATE Dec. 6/82

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Lime Test Bars, e.t.c
7 00											R. Ch. 19
10				—	30	323	187	385			[illegible]
20											
30	445	189	508	—	20	340	192	404			100 [illegible]
40	341	179	401	98	30	353	180	416	50		
50											200 [illegible]
8 00	342	180	405	98	24	347	194	412	50		
10											
20	325	206	394	98	[illegible]	343	195	408	50	NFG.	
30						338	192	400	400T [illegible]		200 [illegible]
40	323	[illegible]	382	98	24	345	187	407	60		
50		181				348	184	405	400T [illegible]		R. 200C
9 00											200 Coke
10	327	123	385	98	32	336	183	397	60		100 Stone
20											
30						337	188	400	50		
40	331	187	393	98	30						
50											
10 00						337	186	399	50		
10	325	181	395	98	30	350	218	423	200T Bar.		200 [illegible]
20						345	190	408	50		
30	323	183	384	98	30						
40						341	186	403	60		
50											
11 00											
10											
20	321	190	384	98	26	339	183	400	60		200 [illegible]
30						338	183	399	60		
40											
50											
12 00											
10											
20											
30											
40						353	189	416	50		
50				98	26						200 [illegible]
1 00				80	30	356	183	417	60		100 [illegible] stone
10	343	175	401	98	34						
20						346	190	409	50		
30											
40											
50											
2 00											
10						349.	185.	410.	60.		200 [illegible]
20						352.	198.	415.	50.		
30											100 sto[illegible]
40											
50											
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Dec 6, 1982 P.M.

Barometric Pressure 29.15" Hg Dry Bulb Temperature 41°F Wet Bulb Temperature 39°F

BLAST AIR 72.5°F

Operating Conditions: normal

O_2 Addition: 100 scfm.

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
4:00	15.5	664	11.0	663	12.5	—	—	—	2758	1.7	27	—	—	—	—
4:20	Blower off (Crane broken down)														
5:00	Blower on														
5:30	13.0	689	10.5	690	9.5	—	—	—	2861	1.7	34	#1	13.0	0.6	12.[illegible]
5:50	Blower off Blower on		5:45 6:00												—
6.10	10.5	677	16.5	565	—	—	8.5	—	2799	1.7	31	#4	11.4	0.0	11.[illegible]
6:30	12.5	715	12.5	605	11.0	—	—	—	2859	1.7	29	#2	13.[illegible]	.5	11.[illegible]
6:50	13.0	793	12.5	700	—	—	9.0	—	2819	1.7	29	#3	12.8	.2	12.[illegible]
7:10	13.5	640	12.5	615	13.5	—	—	—	2822	1.7	28½	#2	14.4	.2	11.[illegible]
7:30	14.0	604	11.0	600	—	—	12.0	—	2821	1.7	30½	—	—	—	—
7:50	12.0	736	12.5	560	10.5	—	—	—	2840	1.7	29½	#1	13.4	.2	11.[illegible]
8:10	Blower —	589	—	—	11.0	—	—	—	—	—	—	—	—	—	—
6.10-7.50 AVG	12.6	694	12.9	608	11.5	—	9.8	—	2827	1.7	29.9	Avg. [illegible] Avg. [illegible]	13.8 12.1	.3 .1	11.5 14.[illegible]

	T.C %		S: %	C.E
17:21	3.46		2.07	4.15
18.08	3.34		2.08	4.05
18:20	3.35		1.96	4.00
18:35	3.29		1.98	3.95
18:12 [19]	3.29		1.87	3.91
19.07	3.20		1.96	3.85
19.32	3.36		1.98	4.02
19:59	3.25	$\bar{x}$ = 3.29	1.73	3.83
21.15	3.01		1.44	3.49

Dec 6th/82

(8) Kam

[ON CONTROL REF RT

DATE Dec 6/82

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Lime Test Bars, e.t.c
3 00											R. 200 Coke
10						346	190	409			5 [illegible]
20											
30											
40											
50											
4 00	316	161	370	98	20	351	183	412			200 Coke
10											
20	333	195	398	98	24	346	177	405			
30						351	189	414	200	75	
40											
50											
5 00	328	180	388	98	24						
10											
20	334	197	400	98	20	347	189	407			
30											
40	346	207	415	98	10	349	190	410			
50											
6 00											
10	334	203	403	98	0	342	200	409			
20											
30	335	186	400	98	0	343	196	408			
40											
50	329	198	395	98	0	341	198	407			
7 00											
10	329	187	391	98	0	339	200	404			
20											200 Coke
30	320	196	385	98	0	337	199	403			R. 4 [illegible]
40											
50	336	198	402	98	0	346	198	410			
8 00											200 Coke
10	325	193	383	98	20	342	194	407			
20											
30											
40											
50											
9 00											
10						338	195	403			
20	[illegible]	143		98	30						
30	301	144	348	98	30						
40	325	166	380	98	30	338	193	402			
50	327	166	382	98	30	336	190	397			
10 00											
10						339	188	404			
20											
30											
40						342	188	406			
50											
11 00											
10											
20											
30											
40											
50											
12 00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec - 6/82 MELTER [illegible] # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquet Red
Bed										
3 15 0	200	60	—	450	—	450	3[illegible]	400	5	)
3 [illegible] 3										
3 [illegible] 6										
3 [illegible] 9										
4 10 2										
4 10 5	400	Coke	200	extra						
4 [illegible] 8										
4 [illegible] 1										
4 [illegible] 4	x		Crane	broke	down.					
4 [illegible] 5										
4 [illegible]										
4 13 1										
4 13 4										
4 14 7										
5 15 0										
5 16 3										
5 17 6										
5 18 [illegible]										
5 [illegible]	full									
5 [illegible] 5										
5 21 0										
5 22 5										
5 23 [illegible]										
5 24 [illegible]										
5 25 6										
5 26 [illegible]										
5 27 4 2										
TOTAL 5										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec - 6/82 MELTER Cupola #8

Wind On ______ A.M. Furnace Dropped ______ P.M. Pressure ______ Ounces Volume ______ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red.
Bed 6:00	200	60	—	450	1	450	300	400	5	1
6:02										
6:07										
6:10	←									
6:13										
6:16		full		105						
6:19				6:10 - 7:55 ⇒ 33 CHARGES						
6:24				Per CH: METALLICS - 1650 lbs						
6:27				coke - 200						
6:30				limestone: 60						
6:34										
6:37										
6:40		full								
6:45										
6:49										
6:53										
6:57										
7:00										
7:04										
7:08										
7:11	400	Coke 200 extra								
7:15										
7:18			1 Sil brick off						(4)	
7:21										
7:24										
7:27										
7:30										
7:33										

TOTAL MELT ______ TOTAL COST ______

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec - 6/82 MELTER Cupola # 8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan- Briquets Red
Bed										
7 35	200	60	—	450	—	450	300	400	4	1
7 38										
7 41										
7 44										
7 46		full								
7 49										
7 52										
7 55 ←										
7 58										
8 01										
8 04	400	Coke 200 extra								
8 10		full								
9 09										
9 12										
9 15										
9 17										
9 20										
9 23										
9 26										
9 29										
9 32										
9 35										
9 38										
24										
25										
26										
27										
TOTAL										

TOTAL MELT ________ TOTAL COST ________

WP&L - 252

CUPOLA REPORT

CUPOLA No: (8) DATE: Dec. 6 '82 SHIFT: [illegible]

Oz on all night.
O carbid.
14 Boxes of Halyard Barrels
Cupola empty

Bed –		
Sand:		lb.
Coke:		lb.
Lime:		lb.
Start –		
Lit:		a.m.
Charge:		a.m.
Blast:		a.m.
Tap:		a.m.
Slag:		a.m.
Stop –		
Charge:	9:38	p.m.
Blast:	10:10	p.m.
Drop:	10:28	a.m.

Meltzona:		lb.
Charges:	79	tons
Poured:		tons
Hours Melted:		hrs.
Tons per hour:		tons
Cupola Loss:		%
Coke Ratio:		
	TO	
Weather:		
Humidity:		%
Temperature:		degrees F.

Tom – Slagged furnace 8:30 pm.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3	50					8			16	69	
10						10		X	16	67	
20						20					
30						30	60 min				
40						40					
50	X				Oz on full.	50					
4			15	67	17 ton	9					
10		X	15	67		10	X		14	67	
20			16	67	crane down	20			14	67	
30	30					30			14	67	
40	X					40			14	67	
50			15	67		50			14	67	
5			15	67		10			10	58	
10			16	67		10					
20			16	67		20					
30			16	67	14 ton	30					
40	15	X	16	67		40					
50						50					
6	X					11					
10			16	67		10					
20			16	67		20					
30			16	67		30					
40			16	67		40					
50			16	67		50					
7			16	67	20 ton	12					
10			16	67		10					
20			16	67		20					
30			16	67	Clean Water Jets	30					
40			16	67		40					
50			16	67		50					

157 ton

Type of Drum	Cans of Alloy	SPOUT	Fe Si. 85% ... lbs.
		TRANSFER LADLES	Fe Si. 85% ... lbs.
	Ø	15 Prime 3 spec.	
		1/2 A65R.	Cupola Tender [signature]

WPL 230

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Dec 8/82

Barometric Pressure 29.79 "Hg Dry Bulb Temperature 37°F Wet Bulb Temperature 33.5°F

Blast Air 63.5°F

Operating Conditions: Normal (Chipped Iron)

O_2 Addition: 100 SCFM

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
8:00	12.5	700	15.5	670	—	—	7.5	—	2768	1.6	50	—	—	—	—
8:20	11.0	655	9.5	755	8.5	—	—	—	2784	1.6	51½	#4	13.2	0	15.[illegible]
8:40	12.0	665	12.0	815	—	—	9.6	—	2802	1.6	44	#2	11.4	0	16.[illegible]
9:00	—	782	13.0	—	13.0	—	—	—	2792	—	—	—	—	—	—
9:10	Blast	Air off													
9:30	Blast	Air on													
9:40	13.0	650	11.0	698	—	—	8.5	—	2761	1.6	41	—	—	—	—
10:00	15.0	626	13.5	632	11.5	—	—	—	2850	1.5	45	#2 #4	15.2 12.4	0 .2	12.6 16.[illegible]
10:20	12.5	680	12.0	555	—	—	10.5	—	2864	1.6	43½	#1 #3	14.0 14.2	.1 .8	13.7 12.8
10:40	17.0	627	15.0	725	13.5	—	—	—	2780	1.6	47	#1	14.0	.2	12.4
11:00	10.5	720	11.0	530	—	—	10.0	—	2769	1.6	47½	#4	10.2	.1	17.7
Avg. 10:00 - 11:00	13.8	663	12.9	610	12.5		10.3		2796	1.6	45¾	Upper Lower	14.4 12.3	.1 .4	12.9 15.6

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 8 /82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Rod
Bed		400								
1 35	180	60	—	450	—	450	300	400	5	1
6 2 37										
6 3 40										
6 4 43										
6 5 46	Fill									
6 6 49										
6 7 58										
7 8 02										
7 9 06										
7 10 10										
7 11 13										
7 12 16										
7 13 20		160			100 Steel					
7 14 24										
7 15 26										
7 16 29	Full									
7 17 35										
7 18 38										
7 19 40	390				200	Coke				
7 20 43										
7 21 46										
7 22 47										
7 23 52										
7 24 55										
7 25 58	Fill		Shut Down							
8 26 04	390					200	Coke			
8 27 12										
TOTAL 5										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT 1

DATE [illegible] MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan Briqu Red
Bed										
1 19	180	6	—	450	—	450	300	400	5	1
2 22										
3 25										
4 27										
5 30										
6 34										
7 3[illegible]										
8 42										
9 44	1-11									
10 47										
11 [illegible]										
12 56	370			2nd coke						2
13 [illegible]										
14 04										
15 07										
16 31										
17 34						100 STONE				
18 37										
19 3[illegible]										
20 43										
21 45										
22 48										1
23 51										
24 54										
25 57	200			10 lb Coke addition!						
26 00	←	10:00 - 11:01								
27 [illegible]		19 CHARGES - 61 minutes								
TOTAL [illegible]										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT: #1

DATE: Dec 8/82 MELTER: Cupola #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Mangan Briqu Red
Bed										
1011	200	60	–	450	–	450	300	400	5	1
1014										
1017										
1020										
1024										
1026										
1027										
1032										
1035										
1038										
1040										
1043										
1047										
1055										
1058	400			200 coke						
1101 ←				100 STONE						
1104										
1106										
1109										
1112										
1115										
1118		Shut Down								
1229										
1236										
1240										
1246										
1249										
TOTAL 1253										

TOTAL MELT ________ TOTAL COST ________

WP&L - 2821

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE (1) Dec 7 '82 MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed		66								
1 256	200	2	—	475	—	450	300	400	5	1
2 257		2								
3 [illegible]		2		12 Cans Carbide						
4 [illegible]		2								
5 [illegible]		2								
6 [illegible]		2								
7 [illegible]		Shut Down								
8 [illegible]										
9 [illegible]										
10 [illegible]										
11 [illegible]										
12 [illegible]										
13 [illegible]										
14 [illegible]	400				Zero Coke					
15 [illegible]										
16 [illegible]		Shut Down								
17 [illegible]	[illegible]									
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec-8-82 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan. Brique Red
Bed 332	200	60	—	450	—	450	300	400	5	1
335	400	[illegible]	extra	Coke						
338										
341										
344										
347										
350										
353		full								
356										
400										
403	400	200	extra	Coke						
406										
410										
414										
417										
420										
424										
427										
430										
433										
436										
439										
442										
445										
448										
451										
454										
TOTAL 457										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec - 8 - 82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Mangan Briqu Red
Bed 500	200	60	—	450	—	450	300	400	5	1
503										
505										
508										
511										
514										
516										
518	400		200	extra	Coke					
521										
524										
527										
530										
533										
536					Ferrocarbo				4	
539										
542										
602										
608										
611										
614										
617										
621										
624										
627										
632										
636										
639										
Total 643										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec - 8 - 82 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquet Red
Bed	2661									
646		60	—	450	-	450	300	400	4	1
649										
652										
655										
658										
701	400		200	Extra	Coke					
704										
707										
710										
713										
716			Pull							
719										
723										
726										
730										
805										
808										
811										
814										
905										
913										
916										
919										
922										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

CUPOLA REPORT

CUPOLA No: 8 DATE: Dec-8/82 SHIFT: Days

Bed - 67"
Sand: ______ lb.
Coke: ______ lb.
Lime: ______ lb.
Start -
Lit: ______ a.m.
Charge: 6:33 a.m.
Blast: 6:45 a.m.
Tap: 7:02 a.m.
Slag: 7:20 a.m.
Stop -
Charge: ______ p.m.
Blast: ______ p.m.
Drop: ______ p.m.

12 Cans Carbide
359" 4 Row Holyoke
351"
O2 on all day

Meltzone: 5,000 lb.
Charges: 101 tons
Poured: ______ tons
Hours Melted: ______ hrs.
Tons per hour: ______ tons
Cupola Loss: 3 hr 20 mins
Coke Ratio: ______
TO
Weather: ______
Humidity: ______ %
Temperature: ______ degrees F.

Time	On	Off	Oz. (32)	CFM (70)	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			32	70		12					
10			32	65	15 Tons	10	1 hr				
20			32	61		20	25 mins				
30			32	62		30					
40			32	62		40	X		22	68	
50			32	62		50			22	68	
8		X	32	62	Breast hole blowing				21	68	
10	X 10 min					10			22	67	
20			28	64		20		X	22	68	26 Ton
30			26	64		30					
40			30	64		40	40 mins				
50			24	65		50					
9			27	65	20 TON	2	X		21	70	
10		X			Clean tuyeres	10			21	70	
20	25 mins					20		X	21	70	23 TON
30	X					30					
40			24	65		40	40 mins				
50			24	65		50					
10			24	65		3					
10			24	65		10					
20			23	67		20					
30			25	67	25 TON	30					
40			25	67		40					
50			26	67		50					
11			26	67							
10		X	26	67		10					
20					27 TON	20					
30						30					
40						40					
50						50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 125 lbs.
		TRANSFER LADLES	Fe Si. 85% 80 lbs.
		Ck #40-13 SPEER-8 A68R-1	
		Cupola Tender [signature]	

WPL 236

IRON CONTROL REPORT

Jim Fitzgerald Supr.

DATE. Jan 8 1982

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limestone Test Bars, e.t.c.
7 00				—							2:190 Ck.
10				—	20						R 5 Silba
20	431	206	490	—	—	353	190	416			100 lb stone on
30						351	193	415	30		
40	333	172	390	98	24						200 lbs.
50				98	30	351	186	413	40		
8 00	329	182	380	98	30						
10						344	187	403	40		200 lbs
20											
30	330	200	387	98	16						
40						350	183	411	40		100 lb stone
50	366	169	372	98	32	354	182	415	6-435	T Bar	
9 00						351	199	411	#700	T Bar.	
10						353	184	414	40		
20											
30											
40						349	186	411	40		
50	329	181	389	98	32						
10 00						343	186	405	40	R.	200 lbs
10											
20				98	28	346	191	410	30		100 lb stone
30	323	197	389	98	18						
40						355	186	417	40		
50	327	165	383	98	24						
11 00						349	185	411	40		200 lbs
10	323	173	381	98	32						
20											
30						355	186	416	40		100 stone
40											
50											
12 00						353	180	412			
10											
20											
30						339	188	402	40		
40											
50						343	184	404	40		
1 00	349	211	419	98	60						
10						341	187	403	40		
20											
30						355	186	417	40		
40											
50											
2 00				98	20						
10						354	186	416	40		200 lbs.
20											
30						344	190	407	30		
40											
50											
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

CUPOLA REPORT

CUPOLA No: (8) DATE: Dec 8 82 SHIFT: [illegible]

Bed –
Sand: .... lb. Ozon all night.
Coke: .... lb. 0 carbide.
Lime: .... lb.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: .... a.m. 14 Boxes Hotspot Barrels
Tap: .... a.m.
Slag: .... a.m.

Stop –
Charge: 9.22 p.m.
Blast: 9.50 p.m.
Drop: 10.12 p.m. Cupola empty

Meltzona: .... lb.
Charges: 80. tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3					20 TON	8	X				
10	30					10			17	68	
20						20		X			
30	X		20	70		30					
40			20	70		40					
50			20	68		50					
4			20	68		9					
10			20	68		10	X				
20			20	68		20			16	68	
30			20	68	Clean Water Jets	30			13	65	
40			19	68		40			7	61	
50			19	68	19 TON	50		X	5	61	
5			19	68		10					
10			19	68		10					
20			17	68		20					
30			17	68		30					
40			17	68		40					
50	20	X				50					
6	X				24 TON.	11					
10			18	68		10					
20			18	68		20					
30			17	68		30					
40			17	68		40					
50			17	68		50					
7			17	68		12					14 TON
10			17	68		10					
20			17	68		20					
30		X	17	68		30					
40						40					
50	35					50					

Type of Drum	Cans of Alloy	SPOUT / TRANSFER LADLES	Fe Si. 85% .... lbs. / Fe Si. 85% 100 lbs.
	0	12 bags Coke. 6 Spar.	
		2 ABS R.	Cupola Tender: [illegible]

WPL 238

(8) [illegible]

IRON CONTROL REPORT

DATE Dec 5/82 [illegible]

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limes Test Bars, e.t.c.
3 00				(90)		345	187	402			R.200 Coke
10											[illegible]
20											
30											200 Coke
40				98	20						
50	317	188	380	98	20	334	190	397			
4 00											
10	319	162	333	98	30	342	184	403			200 Coke
20											
30	333	205	401	98	20	335	187	397			
40											
50	325	201	392	98	20.10	344	189	407	½ con	0	
5 00						361	209	430	200 T.B.		
10	330	200	397	98 0	10 0	371	202	438			
20				0	0	367	205	435			100 stone
30				0	0	365/358	199/193	432/422			
40	327	213	398	98	0	352	197	418			R4 [illegible]
50											
6 00											
10				98	0						
20	340	218	413	98	0	347	200	417			
30											
40	319	183	380	98	0	339	200	406			
50											
7 00	321	173	379	98	10	331	199	396			
10											200 Coke
20	322	182	383	98	10 0	336	193	400			
30											
40	325	184	386	98	0	327	192	391			
50						327	189	390			
8 00						332	191	396	400 [illegible]		
10											
20						335	194	400			
30											
40											
50											
9 00											
10				98	0	339	182	400			
20	300	162	354	98	10	0					
30						333	186	395			
40						345	195	410	200 T.B.		
50						336	181	396			
10 00											
10											
20											
30											
40						339	177	398			
50											
11 00						333	181	384			
10											
20											
30											
40											
50											
12 00											
10											
20											
30											
40											
50											
00											
10											

SECTION 'D': DATA SHEETS FOR GROUP II TESTS
(TUYERE VELOCITY = 76 SFPS)

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Dec 22, 1982 A.M.

Barometric Pressure 29.31 "Hg Dry Bulb Temperature 38 Wet Bulb Temperature 35

Operating Conditions: Normal (2 shift) Blast Air 68%

O_2 Addition: 100 SCFM

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
8:20	12.6	615	9.0	722	—	—	11.0	—	2781	1.6	54	—	—	—	—
8:40	11.5	749	10.0	686	8.0	—	—	—	2747	—	—	#2	11.6	16.0	0.4
9:00	12.0	821	9.5	717	—	—	7.0	—	2798	1.6	51	#4 #1	10.8 11.6	16.6 14.2	0.2 0.8
9:20	Blower off at 9:10 Feed blower air knocked				—	—	—	—	2766	—	—	—			
12:00	Blower on at 11:00 AM 12.5	649	11.5	753	10.5	—			2839	1.65	43	#3	14.2	12.6	0.2
12:20	11.5	660	9.5	675	—		10.0	—	2848	—	—	#4 #1	13.0 15.0	13.4 10.8	0.2 0.2
12:40	12.0	682	11.0	709	7.5	—			2847	1.7	42½	#2	14.0	10.4	0.8
1:00	8.0	725	11.5	686	—		6.5	—	2810	1.7	42	#3	12.8	13.4	0.2
1:20	11.0	674	8.0	714	7.5	—			2824	—	—	#2 #4	15.4 10.6	0.2 15.4	1.2 0.0
1:40	10.0	647	7.0	843	—		7.0	—	2841	1.7	[illegible]	—			
2:00	8.5	599	7.5	841	7.0	—			2835	—	—	#1	10.2	11.2	3.3
2:20	8.5	634	8.0	810	—		6.5	—	2847	1.75	33	—			
AVG 12:00–2:20	10.25	684	9.25	760	8.13		7.5		2838	1.70	39.5	UPPER LOWER	13.65 12.7	10.65 13.7	1.4 0.15

CUPOLA REPORT

CUPOLA No: 8 DATE: Dec 22/82 SHIFT: 1

Bed — 63"

Sand: .... lb.
Coke: 6400 lb.
Lime: 400. lb.

02 on all DAY FULL
NO coal control
50 - 9" 401" 6 BOXES H-400
8 BOXES FOR LADLES

Meltzona: 8000 lb.
Charges: #3 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Start —
Lit: .... a.m.
Charge: .... a.m.
Blast: 6:52 a.m.
Tap: 7:05 a.m.
Slag: 7:35 a.m.

Stop —
Charge: .... p.m.
Blast: .... p.m.
Drop: .... p.m.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			30	69		12			23	67	
10			30	63		10			23	67	
20			32	62	12 TON	20			23	67	
30			32	63		30			23	68	
40			32	63		40			22	68	20 TON
50			32	63		50			22	68	
8			32	62		1			22	68	
10			32	62		10			23	68	
20			32	63		20			23	68	
30			32	62		30			23	68	
40			32	62		40			19	66	
50			31	63		50			19	68	
9			31	63		2			20	67	
10		X	31	66	STEEL HOPPER BROKE —	10			19	67	25 TON
20						20			19	67	
30	1 hr					30		X			
40					14 TON	40					
50	40 min					50	30 min				
10					2 TON	3					
10						10					
20						20					
30						30					
40						40					
50	X					50					
11			23	66							
10			23	66		10					
20			23	66		20					
30			23	66		30					
40			23	66		40					
50			23	67		50					

Type of Drum	Cans of Alloy	SPOUT / TRANSFER LADLES	
		SPOUT	Fe Si. 85% 200 lbs.
		TRANSFER LADLES	Fe Si. 85% 238 lbs.
		15 coke	SPEER 5 AIS 0
			Cupola Tender [signature]

WPL 236

Jim Kilfcud

IRON CONTROL REPORT

DATE Dec 22 / 8

TIME	CUPOLA 8					LECTRO MELT - FURNACE					REMARKS
						400 IRON			200 IRON		Temp., Coke, Limest Test Bars, e.t.c.
	T.C.	Si	C.E.	Graphite Dial	Silicon Dial	T.C.	Si	C.E.	Silicon Add	Graphite Add	
7 00											R200 lt
10				—	30						5 sil.
20	368	170	425	—	36	339	177	398	70		
30											100 limestone
40	354	196	419	—	29	351	177	410	70		
50						362	195	427	200 T	F	K4 ail Brike
8 00	370	198	436	—	—	364	186	426	60		
10						363	184	424	60		
20	334	178	393	98	20	344	172	401	70		R310 coke
30					32	349	174	407	400 T	F	200 lbs.
40	340	182	401	98	32						
50						346	174	404	70		
9 00						342	176	401	400 T Bar.		
10	330	163	384	98	42	348	184	409	200 T Bar.		
20											200 lbs.
30											
40						341	170	398	70		[illegible]
50											
10 00											
10						355	175	413	70		
20											
30											
40											
50											
11 00											
10				98	42	357	173	415	70		
20						360	184	421	200 T	F	
30	367	212	438			343	173	401	70		
40						364	188	427	60		100 Limestone
50	334	155	386			345	177	404	60		
12 00											200 coke
10	346	172	403								
20											
30	328	161	380	98	34						200 coke
40						339	176	398	70		
50											
1 00	320	187	382	98	42						
10						347	176	406	70		200 lbs.
20											
30	318	188	381	98	38						
40						361	184	422	66		
50											200 lbs.
2 00	304	179	364	98	42						
10						346	180	406	66		200 coke
20	329	176	388	98	42						R 220 coke
30											
40						348	183	409	66		
50											
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET SHIFT #1

DATE Dec 22/82 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	200	60		450		450	300	400	5	1
6 35										
6 1 39										
6 3 42										
6 4 45										
6 5 47										
6 6 50										
6 7 54										
7 8 01	210	Coke								
7 9 06										
7 10 12										
7 11 15										
7 12 18										
7 13 22										
7 14 25	Full									
7 15 33										
7 16 36			Extra 100 Stone							
7 17 40										
7 18 43									4.	
7 19 46			Running 4 Sil bk							
7 20 49										
7 21 53										
7 22 56										
7 23 59										
8 24 02	Full									
8 25 08										
8 26 13										
8 27 16										
8 TOTAL X										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec 22 MELTER Cupola #8.

Wind On.............. A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

28.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan. Briquets Red
Bed	210	60		450		450	300	400	4	1
8 [1] 22										
8 [2] 25										
8 [3] 28										
8 [4] 31										
8 [5] 34	410	Extra 200 lbs of Coke.								
8 [6] 37										
8 [7] 40		full								
8 [8] 43										
8 [9] 47										
8 [10] 50										
8 [11] 53										
8 [12] 56										
9 [13] 01										
9 [14] 05										
9 [15] 09										
9 [16] 13			900 Coke							
10 [17] 44			300 Coke on.							
10 [18] 50										
10 [19] 53										
10 [20] 56										
10 [21] 59										
11 [22] 01										
11 [23] 04										
11 [24] 08	Full.									
11 [25] 12										
11 [26] 15										
11 [27] 19	Full									
11 TOTAL 24										

TOTAL MELT.............................. TOTAL COST ....

WP&L - 252

(56)

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec. 22/82 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	210									
11:27		60		450		450	300	400	4.	7
11:32										
11:37										
11:40		160	100	extra	lime-	stone.				
11:43										
11:46										
11:49										
11:52										
11:55										
11:58										
12:01										
12:04	⟵									
12:09										
12:10										
12:12										
12:15										
12:17										
12:20										
12:23										
12:27										
12:29				200 Ch[illegible]						
12:33										
12:36										
12:39										
12:43										
12:46										
12:49										
TOTAL 12:52										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec. 22/82 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

84.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Usor Briquets Metallic	Manganese Briquets Red
Bed	210									
(1) 12:55.		60		450		450	300	400	4	/
(2) 12:57										
(3) 1:01										
(4) 1:04			Extra 200 Coke on.							
(5) 1:08										
(6) 1:11										
(7) 1:14										
(8) 1:17										
(9) 1:20										
(10) 1:22										
(11) 1:24										
(12) 1:27										
(13) 1:30	Full									
(14) 1:36										
(15) 1:40	Extra 200 Coke on									
(16) 1:43										
(17) 1:45	Full									
(18) 1:50										
(19) 1:53										
(20) 1:56										
(21) 1:59	510			300 extra coke.						
(22) 2:02	220	R 220 coke								
(23) 2:08										
(24) 2:11										
(25) 2:14										
(26) 2:17										
(27) 2:20		← 44 Charge		136 min.						
TOTAL 2:23										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Dec. 22/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

112

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220.	60		450		450	300	480	4	1
225										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Dec 22, 1982 P.M.

Barometric Pressure 29.30" Hg Dry Bulb Temperature 38 Wet Bulb Temperature 35

Operating Conditions: [illegible]

O_2 Addition: 100 SCFM

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
[illegible]	11.5	716?	10.0	761	—	—	7.5	—	[illegible]	—	—	#5	10.0?	14.9	0.5
[illegible]	9.0?	—	8.0	—	6.0	—	—	—	[illegible]	1.1?	[illegible]	#4 #1	9.5 14.4?	12.4 3.9?	2.3 [illegible]
[illegible]	8.5	656?	11.0	833?	—	—	7.0	—	2837?	1.1?	[illegible]	#2	11.0	15.4	[illegible]
[illegible]	10.0	656	11.0	785	9.0	—	—	—	2827?	1.1	[illegible]	#3	9.5	17.4	[illegible]
[illegible]	7.5	600	8.5	720	—	—	8.0?	—	2837?	1.7	[illegible]	#1 #2	12.5? 11.2?	12.0 —	0.5? —
5:10	9.6?	595	9.0	636?	7.5	—	—	—	2842?	1.7?	[illegible]	—	—	—	—
AVG 3:30 4:10-5:10	9.3	665	9.7	751?	7.5		7.5		2833	[illegible]	29.0	UPPER LOWER	12.6 10.6	12.4 14.9	0.5 1.0

CUPOLA REPORT

CUPOLA No: (8) DATE: Dec 22/82 SHIFT: [illegible]

Bed –
Sand: .... lb.
Coke: .... lb.
Lime: .... lb.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: .... a.m.
Tap: .... a.m.
Slag: .... a.m.

Stop –
Charge: 10 34 p.m.
Blast: 11 05 p.m.
Drop: 11 13 p.m.

Meltzona: .... lb.
Charges: [10] tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: ....
TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

9 BOXES HELSPOT (LADLES)

Check lectroheath for slag OK [illegible]

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3	X				21 TON	8			16	66	
10			16	68		10		X	14	66	
20			16	68		20					
30			18	66		30					50 min. 25 Ton
40			18	66		40					
50			17	66		50					
4			17	66	24 TON	[illegible]	X				
10			17	66		10			16	66	
20			17	66		20			16	66	
30			17	66		30			16	66	
40			17	66		40			16	66	
50			15	66		50			16	66	
5			15	66		10			16	66	
10			15	66		10		X	15	66	26 Ton Break
20			15	66		20	15 min.				
30		X	15	66	27 TON full	30	X				
40	35		15	66		40			14	66	
50					Break	50			10	66	
6						11			8	60	
10	X 10	X	15	66		10					
20	X				Bucket stuck	20					
30			16	66		30					
40			16	66		40					
50			16	66		50					
7			16	66		12					12 TON
10			16	66		10					
20			16	66	25 Ton	20					
30			16	66		30					
40			16	66		40					
50			16	66		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 100 lbs.
		TRANSFER LADLES	Fe Si. 85% 150 lbs.

26 Bags #40 5 Bags [illegible] 1 to fill [illegible]
1 Bag A65R Cupola Tender [illegible]

(8) Glen

IRON CONTROL REPORT

DATE: Dec 22/82 nigh[illegible]

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limestc Test Bars, e.t.c.
3 00				98	44	347	180	407			R 210 Coke
10											R. 5 Sil Bug[illegible]
20	308	165	363	98	44	352	179	412			200 Coke
30											
40	322	189	385	98	~~26~~ 30	345	180	405			100 ~~Coke~~
50											
4 00	314	176	373	98	30	332	183	393			200 Coke
10											
20	327	195	392	98	20	339	188	402			
30											
40	325	168	381	98	26	344	184	405			200 Coke
50						332	198	398	200 TBNC		
5 00	330	174	388	98	26	339	182	400			
10											
20	325	187	387	98	26	349	181	409			200 Coke
30											
40	320	175	378	98	26	340	186	402			200 Coke
50											
6 00						345	191	409			
10						346	186	408			
20						343	197	409	200 TB		
30	320	170	377	98	26	349	185	4.11			200 Coke
40											
50	324	189	387	98	26	341	189	404			
7 00											
10	325	181	385	98	26	348	187	410			200 Coke
20											
30	323	188	390	98	26	358	184	419			
40											
50	330	190	393	98	26	348	181	408			
8 00											
10	334	186	398	98	26	346	183	407			200 Coke
20											
30											Break
40											
50											
9 00											
10	307	199	373	98	20	345	188	408			
20											200 Coke
30	308	172	365	98	20	332	193	396			
40						331	188	394			
50	333	180	393	98	20	343	177	402			
10 00						365	187	427	200 To Floor		
10	331	172	388	98	20						200 Coke
20						348	185	410			
30											
40						~~417~~	~~159~~	~~?~~			
50	345	188	408	98	20	339	183	400			
11 00	316	175	376	98	20						
10						342	186	404			
20											
30						341	186	403			
40											
50											
12 00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec 22/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquets Red
Bed										
3:01	210	60	—	450	—	450	300	400	5	1
3:05										
3:08										
3:10										
3:15	410			200 Coke						
3:18										
3:20										
3:23										
3:26										
3:29										
3:32										
3:35										
3:38										
3:42		160		100 stone						
3:46										
3:49	410			200 Coke						
3:51										
3:55										
4:00										
4:05										
4:09	←									
4:13										
4:17										
4:22										
4:26										
4:29										
4:34	410			200 Coke						
TOTAL 4:37										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec 22/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 26 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquets Red
Bed										
4 41	210	60	—	450	—	450	300	400	5	1
4 45										
4 48										
4 51										
4 5 54	Full									
5 00										
5 03										
5 07	410			200 Coke						
5 9 10	←	17 charges		59 min						
5 10 15										
5 11 18										
5 12 22	410			200 Coke						
5 13 25		Shut Down								
5 14 28	Full									
6 15 04										
6 16 08										
6 17 19										
6 18 23										
6 19 26	410			200 Coke						
6 20 29										
6 21 32										
6 22 37										
6 23 39										
6 24 43										
6 25 45	Full									
6 49										
6 52										
TOTAL 6 56	410			200 Coke						

TOTAL MELT .... TOTAL COST ....

WP&L - 252

Ce

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec 22/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
701	210	60		450		450	300	400	6	1
703 5										
708										
712										
715										
718										
722										
725										
729										
731										
735										
738										
740										
744										
746										
750										
753										
755										
757										
801	410	[illegible]			Low Coke					
807										
812		Shut - Down								
903										
907										
910										
913										
916										
919										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Dec 22/82. MELTER [illegible] # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 9:22	210	60	—	450	—	450	300	400	5	1
9:25	410				200 Coke					
9:28										
9:31										
9:34										
9:37										
9:40										
9:43										
9:46										
9:49	Full									
9:55										
9:58										
10:01										
10:05										
10:09	410				200 Coke					
10:16										
10:34										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date JAN. 10 1985 [illegible]

Barometric Pressure 29.01 "Hg Dry Bulb Temperature 40 °F Wet Bulb Temperature [illegible] °F

Operating Conditions: [illegible] [illegible] [illegible]

O_2 Addition: 100 SCFM.

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
[illegible]	[illegible]		10.5		8.0				[illegible]	[illegible]	44				
9:10															
9:[illegible]	[illegible]	[illegible]	9:20 – 9:35												
9:40	8.0	[illegible]	8.0	571	8.0		5.5		[illegible]	1.65	38¼				
[illegible]	9.0	650	10.5	674	9.0		6.5		[illegible]	1.7	43				
[illegible]	15.0	662	8.0	746	6.0		5.5		2795	1.7	44¼	#2	10.4	[illegible]	[illegible]
10:40	12.0	602	9.0	710	5.5		8.0		2760	1.75	41½				
10:50												#3 #4	[illegible]	[illegible]	[illegible]
11:00	9.0	575	7.0	[illegible]	6.0		9.0		2824	1.8	42				
11:20	6.0		6.5	[illegible]			6.5		2821	1.75	41¼				
11:40	7.0	812	6.0	592	7.0		10.0		2813	1.75	45¾				
1:00												[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	9.4	661	8.1	719	7.3		7.6		2805	1.73	43.0	Upper Lower	10.6 7.1	10.3 15.6	1.2 2.4

(8) Jolar

IRON CONTROL REPORT

DATE Jun 10/83

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTROMELT-FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limes Test Bars, e.t.c.
7 00											R 190 Coke
10				~~0~~	30						5 site
20											
30	409	168	465	~~0~~	30	347	178	406			
40											
50	347	182	408	98	3020	341	190	404			200 Coke
8 00											
10	328	187	381	98	20	342	189	404			R 200 Coke
20						346	188	409	200	floor	200 Coke
30	328	170	385	98	26	344	173	398			
40											
50											
9 00	313	163	367	98	30	345	170	402			200 Coke
10											100 stone
20	319	181	399	98	30	342	166	392			
30											
40	288	178	340	98	30	328	177	387			200 Coke
50						334	189	397	200	floor	
10 00	331	191	395	98	26	328	174	386			200 Coke
10											
20						345	183	406			100 stone
30						346	193	410	200	TB	
40	310	187	372	98	26	343	185	405	400	TB	200 Coke
50											R 210 Coke
11 00	319	197	385	98	26	349	188	410			
10											12 cans carbi
20	321	182	382	98	26	356	183	417			200 Coke
30											
40	330	173	388	98	30	378	193	442			
50	335	189	398	98	26	356	193	4[illegible]			
12 00	31[illegible]	171	374	98	26	353	187	415	400	floor	
10											200 Coke
20											
30											
40						350	191	414			
50	288	156	340	98	20	340	192	404			
1 00											
10	303	188	366	98	26	344	188	407			
20						342	200	409	200	floor	
30	317	199	383	98	24	349	188	412			200 Coke
40											
50	316	198	382	98	20	349	184	410			100 LIMESTONE
2 00											
10											
20	329	187	391	98	20	353	192	419			200 Coke
30											Shut down
40						341	192	405			
50											
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 10 / 83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Usar Briquets Metallic	Manganese Briquets Red
Bed 642	190	400/60	—	450	—	450	300	400	5	1
645										
648										
651										
654	Full									
707										
710										
713										
718										
722										
726										
730										
733										
737										
741										
745										
749	390			200 Coke						
751										
754										
757										
801										
806	200									
808	400				10 lbs Coke added					
814					200 Extra Coke					
817										
822		Shut Down								
831										
TOTAL 835	Full									

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 10 /83 MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 8:44	200	60	—	450	—	450	300	400	5	1
8:47										
8:51										
8:55	400				200 Coke					
9:00		160			140 Stone					
9:05										
9:08										
9:10										
9:13										
9:16	Fill									
9:35										
9:40		←								
9:43	400				200 Coke					
9:46										
9:47										
9:52										
9:55	400				200 Coke					
9:58										
10:01	Fill									
10:04										
10:07		160			100 Stone					
10:11										
10:15										
10:17										
10:20										
10:23	Fill									
10:26	400				200 Coke					
Total 10:30										

TOTAL MELT .... TOTAL COST ....

WPBL - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 10/83 MELTER [illegible] #2

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

10 lb [illegible] added.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquets Red
Bed 10:34	210	60	—	450	—	450	300	400	5	1
10:37										
1040	[illegible]									
1044										
1047										
1050										
1053		2		12 Cans Carbide						
1056		2								
1100		2								
1103	[illegible]	2								
1107	410	2		200 Coke						
1113		2								
1116										
1119										
1123										
1126										
1129										
1132										
1135										
1139										
1143	←		38 Charges	123[illegible]						
1145										
1149										
1153										
1156										
1200	410	[illegible]				200 Coke				
1207										
1210										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 10 /83 MELTER [illegible] #8

Wind On ✓ A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges ~~8~~ 4	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganes Briquets Red
Bed										
12 1 14	2?0	60	—	450	—	450	300	400	5	1
12 2 29										
12 3 31										
12 4 40										
12 5 44										
12 6 47										
12 7 51										
12 8 53										
12 9 55										
12 10 58										
1 11 02	[illegible]									
1 12 10										
1 13 14										
1 14 18										
1 15 21	410			200 Coke						
1 16 24										
1 17 27										
1 18 30										
1 19 33										
1 20 35										
1 21 38										
1 22 41										
1 23 44										
1 24 46										
1 25 49										
1 26 52										
1 27 55										
TOTAL 1 57		160			100 Stone					

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 10 /83 MELTER Cupola #4

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges #/2	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangane Briquet Red
Bed 2:02	210	60	—	450	—	450	300	1400	5	1
2:05										
2:08										
2:11	Fuel									
2:17										
2:21	410			2000 Cal[illegible]						
7			[illegible]							
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

CUPOLA REPORT

CUPOLA No: (8) DATE: Jan 18 '83 SHIFT: Day 2

Bed – 63"
Sand: .... lb.
Coke: 6000 lb.
Lime: 400 lb.

O2 on all day
35 x 1"
35 x 9"
4 boxes Helspot.
12 cans carbide.
9 BOXES HELSPOT (LADLES)

Meltzone: 6500 lb.
Charges: 118 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: 6:59 a.m.
Tap: 7:13 a.m.
Slag: 7:40 a.m.

Stop –
Charge: .... p.m.
Blast: .... p.m.
Drop: .... p.m.

O2 on full.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			21	70		12			24	68	
10			21	70		10			24	68	
20			24	66		20	20 Min	X			
30			25	64		30					23 TON.
40			25	64	16 TON.	40			20	70	
50			27	63		50			21	70	
8			27	63		1			21	69	
10			27	63		10			21	69	
20	15 Min	X	27	62	20 TON.	20			20	69	
30			27	62		30			20	69	
40	X					40			20	69	
50			25	63		50			21	69	
9			25	63		2			21	69	
10	15 Min	X	23	63.		10			21	69	27 TON
20					Coke scales sticking.	20		X	21	69	
30	X					30					
40			20	65		40	40 Min				
50			20	65		50					
10			23	65		3.					
10			23	65	17 TON	10					
20			23	65		20					
30			23	65		30					
40			24	67		40					
50			24	67		50					
11			23	67							
10			23	67		10					
20			23	67		20					
30			24	68		30					
40			24	68	18 TON	40					
50			24	68.		50					

Type of Drum	Cans of Alloy	SPOUT	Fe Si. 85% 75 lbs
		TRANSFER LADLES	Fe Si. 85% 150 lbs.
	Ø	18 bags #40	10 bags Spec.
		1 Bag 465 R.	Cupola Tender: [signature]

HPL 238

HATCH ASSOCIATES LTD Project #9003

KELSEY-HAYES CANADA DATA

Date [illegible] 1982 P.M.

Barometric Pressure 28.8? in. Dry Bulb Temperature 4[illegible] Wet Bulb Temperature 41[illegible]

Operating Conditions: [illegible] (2-[illegible]) [illegible]

O_2 Addition: [illegible]

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
15:[illegible]	[illegible]	720	10.0	795	9.5		[illegible]		[illegible]	1.0	34				
15:50	11.5	626		740	6.0		8.0		[illegible]						
16:00												#2 #3	10.0 [illegible]	[illegible]	[illegible]
[illegible]	11.5	648	9.5		7.5		10.0		2846	1.8	[illegible]				
16:30	9.0	754	10.5	747	9.5		7.0		2851	1.85	[illegible]				
16:40												#1 #4	[illegible]	[illegible]	[illegible]
16:50	10.0	845	9.5	751	3.0		9.0		2866	1.9	[illegible]				
17:10	10.0	715		712					2843	1.85	[illegible]				
17:15	Blower off														
[illegible]	11.2	720	10.4	749	8.3		8.7		2840	1.8[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CUPOLA REPORT

CUPOLA No: 3 DATE: Jan 14 1983 SHIFT: night

Bed –
Sand: lb. — NO coal carbonate
Coke: lb.
Lime: lb. — 70 2 BOXS HELSPOT

Start –
Lit: a.m.
Charge: a.m.
Blast: a.m.
Tap: a.m.
Slag: a.m.

Cupola Empty

Stop –
Charge: 10:36 p.m.
Blast: 11:02 p.m.
Drop: 11:13 p.m.

Meltzone: lb.
Charges: 100 tons
Poured: tons
Hours Melted: hrs.
Tons per hour: tons
Cupola Loss: %
Coke Ratio: TO
Weather:
Humidity: %
Temperature: degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3	15 min				22 TON	8		X	15	69	23 TON
10						10					CRANE BROKE DOWN
20		X	16	69		20					
30			16	69		30		60			
40			18	69		40					
50			18	69		50					
4			20	69		9	X		15	69	
10			21	69		10			15	69	
20			18	69		20			15	69	
30			18	69	26 TON	30			15	69	Clean Water Jets
40			19	69		40			15	69	
50			19	69		50			15	69	21 TON
5			19	69		10			15	69	
10		X	18	69	Clean tuyeres	10			15	69	
20					27 TON	20			14	64	
30	50					30			14	64	
40	min					40			12	63	
50						50			10	63	
6						11			8	63	
10	X		16	69		10		X			
20			16	69		20					
30			16	69		30					
40			16	69		40					
50			16	69		50					16 TON
7			16	69		12					
10			15	69		10					
20			15	69		20					
30			15	69		30					
40			15	69		40					
50			15	69		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 50 lbs.
		TRANSFER LADLES	Fe Si. 85% 190 lbs.
		Prime -16	SPEER-9 #651-1
			Cupola Tender Jim Wolfkleiss

WPL 230

IRON CONTROL REPORT

[illegible] DATE: Jan. 19/83

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Lime, Test Bars, e.t.c
3 00						339	185	402	20		[illegible]
10											[illegible]
20				98	—						
30	322	165	377	98	30						[illegible]
40						345	187	408	60		
50											
4 00	310	188	373	98	24	345	185	407	66		[illegible]
10						345	201	412	200	[illegible]	
20											
30				98	22	351	187	413	66		
40	314	201	383	98	—						[illegible]
50											[illegible]
5 00				98	—	351	192	415	50		
10											
20											
30						345	186	410	30		
40											
50											
6 00											
10			[illegible]	98	—	346	186	411	30		[illegible]
20											[illegible]
30	310	198	386	98	—						[illegible]
40						347	197	413	30		
50						/					
7 00	319	192	383	98	—						[illegible]
10						348	192	412	50		
20											
30	327	180	389	98	24						
40					—	364	188	432	50		
50						363	192	427	40		
8 00	314	159	367								
10											
20						360	186	422	50		
30											
40											
50											
9 00											
10											
20						346	188	404	60		
30	307	165	365	98	36						[illegible]
40						344	177	403	70		
50	307	168	363	98	42						[illegible]
10 00											
10						354	179	414	70		
20											
30	314	222	388	98	—						
40						360	189	413	60		
50											
11 00						346	176	405	70		
10											
20											
30						340	189	403	60		
40											
50											
12 00											
10											
20											
30											
40											
50											
1 00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT .... #2

DATE Jan 10 /83 MELTER Purple # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed										
3 1 14	220	60	—	450	—	450	300	400	5	1
3 2 17										
3 3 20										
3 4 23										
3 5 26										
3 6 29										
3 7 32										
3 8 35	420		200	Ex Coke						
3 9 38										
3 10 41										
3 11 44										
3 12 47										
3 13 50										
3 14 53	Full									
3 15 57										
4 16 00										
4 17 03										
4 18 06	420	Full	200	Coke						
4 19 12										
4 20 15										
4 21 18										
4 22 24										
4 23 27										
4 24 30										
4 25 33										
4 26 36										
4 27 39	420	160	200	Coke	100	Lime	Stone			
4 TOTAL 42										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT *II 2*

DATE *Jan 10/83* MELTER *Cupola II 8*

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges *98*	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed	*220*	*60*	*—*	*450*	*—*	*450*	*300*	*400*	*5*	*1*
4 1 *45*										
4 2 *47*										
4 3 *51*	*Full*									
4 4 *58*										
5 5 *01*										
5 6 *06*										
5 7 *09*										
5 8 *12*										
5 9 *15*	*Full*									
6 10 *00*										
6 11 *03*		*160*	*100*	*Lime Stone*						
6 12 *15*	*420*		*200*	*Coke*						
6 13 *18*										
6 14 *21*										
6 15 *24*										
6 16 *27*										
6 17 *30*										
6 18 *33*								*R*	*4*	*Sil B[illegible]*
6 19 *36*	*Full*									
6 20 *42*										
6 21 *45*										
6 22 *48*										
6 23 *51*										
6 24 *54*										
6 25 *56*										
6 26 *59*										
7 27 *02*		*160*		*100 lbs Stone*						
7 TOTAL *05*										

TOTAL MELT .... TOTAL COST ....

WP&L - 262

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT # 2

DATE Jan 10/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 5 6	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60	—	450	—	450	300	400	4	1
7 1 08										
7 2 12										
7 3 15	Full									
7 4 18										
7 5 21										
7 6 24	Full									
7 7 30										
7 8 33										
7 9 36										
7 10 39										
7 11 42										
7 12 45										
7 13 48										
7 14 51										
7 15 54	Full									
8 16 50										
8 17 53										
8 18 56										
9 19 00	420	Full	200	Coke						
9 20 06										
9 21 09										
9 22 12										
9 23 15										
9 24 18										
9 25 21										
9 26 24										
9 27 27										
9 TOT 30	Full									

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 10/88 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquets Red
Bed	220	60	–	450	–	450	300	400	4	1
1 9:35										
2 9:38	420		200 Coke							
3 9:42										
4 9:45										
5 9:50										
6 9:53										
7 9:56	420		200 Coke							
8 9:59										
9 10:03										
10 10:06										
11 10:09										
12 10:15										
13 10:18	Full									
14 10:24										
15 10:28										
16 10:31	Full									
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

100

TOTAL MELT .... TOTAL COST ....

HF&L - 352

SECTION 'E': DATA SHEETS FOR GROUP III TESTS
(TUYERE VELOCITY = 140 SFPS)

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date JAN 19/83 DAY SHIFT

Barometric Pressure 29.6" Hg Dry Bulb Temperature 20°F Wet Bulb Temperature Not Functional Assume 20°F

Blast Air Temp. 60°F

Operating Conditions:

O_2 Addition: 100 SCFM

Tuyeres: 12(25 mm x 25 mm) + 4(6.4 mm x 75 mm) Original. Tuyeres with graphite flex left unrestricted

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
9:00	12.5		11.5		9.0		10.5		2787	1.1	36 3/4				
10:00	11.5	885	11.5	1310	7.5		9.5		2731	1.1	37				
10:20	← BLOWER OFF														
10:40	12.5	950	8.0	1067	8.0		–		2775	1.1	36 1/4	1	7.0	12.0	2.2
11:00	10.0	1018	10.5	1178	3.5		–		2312	1.2	34 1/2				
11:20	12.0	746	12.0	1211	3.5		8.0		2821	1.1	36 3/4				
11:40	14.5	770	14.5	1078	12.5		13.0		2834	1.2	36 1/2				
12:00	11.0	747	11.5	775	–		–		2262	1.1	36 1/2				
13:20	7.5	1305	9.0	970	–		–		2863	1.2	30 1/2	2	[illegible]	12.4	2.4
13:40	11.5	1152	8.5	1418	8.0	–	8.0		2850	1.1	31 1/2				
14:00	11.0	1200	8.0	1195	7.0	–	7.5		2845	1.2	33	3	6.4	14.6	3.0
14:20	10.0	1369	9.0	1157	8.0				2848	1.2	35				
14:30												4	6.4	17.6	1.8
Ave.	11.5	1034	10.4	1133	8.8		9.4		2324	1.15	35.1	TOP BOT.	9.3 6.4	12.2 16.1	2.6 2.4

52[illegible] CFM air

CUPOLA REPORT

CUPOLA No: 8 DATE: Jan 19/83 SHIFT: day

Bed – 62 1

Sand: .... lb. 35 4
Coke: 6300 lb. 35
Lime: 400 lb.

O2 on all day

Start –
Lit: .... a.m.
Charge: 630 a.m.
Blast: 645 a.m.
Tap: 6:58 a.m.
Slag: 7:35 a.m.

Stop –
Charge: .... p.m.
Blast: .... p.m.
Drop: .... p.m.

Meltzona: 6000 lb.
Charges: 130 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: 1 hr. %
Coke Ratio: ———— TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz. (19)	CFM (68)	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			21	64		12			19	68	
10			21	63	Clean Water Jets	10		x	19	68	
20			22	63	16 Ton	20	15 min				Clean tuyeres
30			20	63		30	X				
40			20	64		40			16	68	
50			21	64		50			15	68	
8			19	64		1			16	68	
10			19	64		10			16	68	Clean Water Jets
20			19	65		20			16	68	
30			19	65		30			17	64	22 Ton
40			20	65		40			17	68	
50			21	66		50			18	68	
9			21	66		2			17	68	
10		x	21	66	Clean tuyeres	10			17	68	
20	15 min				17 TON	20			17	68	23 TON
30	X		18	67		30			17	68	
40			18	67		40		x	19	68	
50			19	67		50	20 min				
10			19	67		3					
10	10 min	x	20	68		10					
20	X					20					
30			19	68		30					
40			19	68		40					
50			18	68		50					
11			19	68							
10			19	68		10					
20			19	68	15 Ton	20					
30			18	68		30					
40			18	68		40					
50			19	68		50					

Type of Drum	Cans of Alloy	SPOUT / TRANSFER LADLES	
		SPOUT	Fe Si. 85% 440 lbs.
		TRANSFER LADLES	Fe Si. 85% 250 lbs.
		Prime 19	SPEER 12 AGER 2
		50 / 31	Cupola Tender [signature]

WPL 238

IRON CONTROL REPORT

[illegible]

DATE Jan. 18/83

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limest Test Bars, e.t.c.
7 00											R. 205 Ck.
10	413	169	464	–	34						R. 5 Silica
20						344	176	400	70		
30											
40	331	186	393	98	34	335	175	393	70		200 Clean
50						335	175	393	70		
8 00	307	170	364	98	40	331	175	389	70		200 Clean.
10	302	161	356	98	44	331	173	389	70		
20						344	172	401	70		Temp 272
30											
40	315	177	374			340	174	398	70		R. 210 Co
50											200 Coke
9 00	317	183	378	98	42	369	199	435	200 Floor		
10						343	178	402	70		
20						348	199	414	200 Floor		
30											
40				98	36	340	182	401	66		
50	316	154	367	98	44	342	201	409	200 T.B.		200 Clean.
10 00						334	181	394	400 T. Bn. No Coat.		
10	317	181	380	98	42	342	168	398	70		
20						339	179	399	70		~~200~~
30											200 Clean
40						342	175	400	70		
50	307	203	375	98	32	348	178	405	70		200 Clean
11 00						342	177	401	70		
10						343	176	402	400 T.B.		
20	310	[illegible]	368	98	40						
30						337	176	396	70		
40											R. 220 Coke
50	314	208	383	98	36	346	176	405	70		200 Coke
12 00											
10				98	32	339	189	402	66		
20											
30											
40						345	185	407	66		100 lb stress
50	305	153	356	98	42						200 Clean.
1 00						339	173	397	70		
10											
20	312	181	322	98	42						
30						338	175	396	70		200 Coke
40	315	181	325	98	42						Lo Sil.
50						351	178	411	66		
2 00											Temp 27
10	317	186	382	98	32	351	176	410	66		
20											200 Clean
30				98	40	341	178	410	70		100 lb stress
40	307	191	371	98	30						
50						338	175	389	70		
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 19/82 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	900	60		450						
6 1 35		400	—	900	—	450	300	400	5	1
6 2 38										
6 3 41										
6 4 44										
6 5 47										
6 6 50										
6 7 53										
6 8 56										
6 9 59	Full									
7 10 03										
7 11 06										
7 12 09										
7 13 12										
7 14 18										
7 15 21	Full									
7 16 24	Full									
7 17 29										
7 18 32										
7 19 35										
7 20 38	400	~~Full~~	900	Coke						
7 21 46										
7 22 49										
7 23 52										
7 24 55										
7 25 58	400	200	Coke							
8 26 03										
8 27 06				400 Coke on						
8 TOTAL 09										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT: #1

DATE Jan 19/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
28										
Bed	900	60	--	450 400	--	450	500	400	5	1
8 1 18										
8 2 21										
8 3 24	210		10 lb Coke added							
8 4 27	Full									
8 5 32										
8 6 35										
8 7 38										
8 8 41	410			200 Coke						
8 9 47										
8 10 50										
8 11 53	410			200 Coke						
8 12 56	Full									
9 13 03										
9 14 06										
9 15 09										
9 16 12										
9 17 15										
9 18 21	Full									
9 19 33										
9 20 36										
9 21 39										
9 22 42										
9 23 45	Full									
9 24 54										
9 25 57										
10 26 00										
10 27 03										
10 TOTAL 06	1110		900 Coke							

TOTAL MELT .... TOTAL COST ....

WPSL - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 18/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	210	60								
10 1 09			2	450 / 400	–	1150	300	400	5	1
10 2 12	Full									
10 3 23										
10 4 27	410		200 extra coke							2
10 5 31										2
10 6 35										2
10 7 38										2
10 8 40										2
10 9 46										2
10 10 49										2
10 11 52										2
10 12 55										2
10 13 00										2
11 14 03	410		200 Coke							1
11 15 06										
11 16 09										
11 17 12										
11 18 15										
11 19 18										
11 20 21										
11 21 24										
11 22 29										
11 23 31	220									
11 24 34										
11 25 37	420		200 Co/c							
11 26 40										
11 27 44										
11 TOTAL 48										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 19/93 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquette	Cast Iron Scrap	Steel Scrap	Ucar Briquette Metallic	Manganese Briquette Red
11 51	220	60	-	450 ~~400~~	-	450	300	400	5	1
11 54										
11 57										
12 00										
12 06										
12 09										
12 12										
12 15	Full									
12 33										
12 37										
12 40										
12 43										
12 46										
12 49										
12 52										
12 55										
12 57	420		200 Coke							
1 00										
1 03										
1 06										
1 09										
1 12										
1 15										
1 18										
1 21										
1 27										
1 30	420		900 Coke						[illegible]	
1 33										
TOTAL 1 36										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 19/83 MELTER Cupola II 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge PM	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
1 40	220	60								
1 44			—	450 ~~400~~	—	450	300	400	6	1
1 47										
1 50										
1 53										
1 56	Full									
2 00	"									
2 06										
2 09										
2 12										
2 10 15	420		300 Coke							
2 11 18										
2 12 21										
2 13 24										
2 14 27										
2 15 30	Full	160	100 lbs Stone							
2 16 33										
2 17 38	Full									
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

130

TOTAL MELT .... TOTAL COST ....

KP&L - 262

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Jan 19/83 Night Shift

Barometric Pressure [illegible] Hg Dry Bulb Temperature < 20°F say 18°F Wet Bulb Temperature [illegible]

Operating Conditions: [illegible]

O_2 Addition: 100 SCFM O_2

Tuyeres [illegible]

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
16[illegible]	11.0	1320	10.5	1186	8.0		8.5		2240	1.3	36				
16 20	11.5	1130	10.0	1202	8.0		8.0		2335	1.2	33½				
16[illegible]	15.0	1004	10.5	1256	8.0		10.0		2313	1.3	33	1	9.8	12.4	1.6
17[illegible]	9.5	1037	9.5	1076	9.5		10.0		2350	1.3	31½				
17[illegible]		972			8.0					1.2	31¼	[illegible] 3	10.0	[illegible]	1.6
17[illegible]	← BLOWER OFF →														
18[illegible]															
18[illegible]															
[illegible]	10.0	914	9.5	969	8.5		9.0		2790	1.3	29½				
[illegible]	10.0	1004	10.0	1036	9.0		9.0		2808	1.3	28½	2	10.0	[illegible]	[illegible]
[illegible]	12.0	815	9.5	954	8.5		9.5		2330	1.3	27¾				
												11 30 4	10.4	[illegible]	[illegible]
Ave.	11.3	1039	9.9	1053	8.4		9.1		2324	1.28	31.4	Top Bottom	9.9 10.2	11.5 [illegible]	1.2 1.1

CUPOLA REPORT

CUPOLA No: (9) DATE: Jan 19 '83 SHIFT: night

Oz on all night
0 carbide.

Bed –		Meltzona:	lb.
Sand:	lb.	Charges: 94	tons
Coke:	lb.	Poured:	tons
Lime:	lb.	Hours Melted:	hrs.
Start –		Tons per hour:	tons
Lit:	a.m.	Cupola Loss:	%
Charge:	a.m.	Coke Ratio: TO	
Blast:	a.m.	Weather:	
Tap:	a.m.	Humidity:	%
Slag:	a.m.	Temperature:	degrees F
Stop –			
Charge: 1035	p.m.		
Blast: 1105	p.m.		
Drop: 1115	p.m.		

cupola empty
15 BOXES HELSPOT (LADLES)

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3	x				19 ton	8			16	69	
10			15	68		10		x	16	69	
20			16	69		20					
30			16	69		30	50				
40			18	68		40					
50			18	69		50					
4			18	69	25 ton	9	x				
10			18	69		10			14	69	
20			18	69		20			14	69	
30			18	69		30			14	69	
40			18	69		40			14	69	
50			18	69		50			14	69	
5			18	69		10			14	69	
10			18	69		10			16	69	
20			18	69		20			15	69	
30		x	18	68		30			15	69	
40					Apron conveyor down	40			13	69	
50	1 Hrs					50			8	62	
6						11		x			
10						10					
20	x					20					
30			16	69		30					
40			16	69		40					
50			16	69		50					
7			16	69		12					
10			16	69		10					
20			16	69		20					16 ton
30	15	x	16	69	28 ton	30					
40						40					
50		x	16	69		50					

Type of Drum	Cans of Alloy	SPOUT / TRANSFER LADLES	
		SPOUT	Fe Si. 85% 75 lbs.
		TRANSFER LADLES	Fe Si. 85% 175 lbs.
		16 Prime 8 open.	
		1 AGSTR	Cupola Tender: [signature]

WPL 236

(8) Ham

I..ON CONTROL REP_RT

DATE Jan 9/83 night [?]

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limestone, Test Bars, e.t.c.
3 00						342	180	408			R. 220 Coke
10				98	20						R 6 Fill B [?]
20	284	186	356	98	30	337	192	401			100 stone
30					26						200 Coke
40											
50	318	180	351	98	20	337	187	399			
4 00											R. 5 Fill Bi [?]
10	310	192	374	98	10	331	190	394			200 Coke
20											~~100 stone~~
30	309	183	370	98	10	330	190	393			200 Coke
40											
50	317	179	377	98	10	336	178	386			
5 00											
10	309	173	367	98	10	339	187	401			
20											
30	327	186	389	98	10	337	184	388			200 Coke
40											
50						355	197	421	200		
6 00											
10						343	181	408			
20						346	193	410	200	[illegible]	
30				98	10						100 stone [illegible]
40	302	150	354	98	20	345	184	406			
50											
7 00	316	148	365	98	30	341	181	401			200 Coke
10											
20	321	184	382	98	30	346	178	405			
30											200 Coke
40	316	200	382	98	20	347	178	406			
50											
8 00											
10	307	188	370	98	20	349	182	400			
20	325	198	390								
30						339	187	401			
40											
50											
9 00											
10	310	191	374	98	20	338	191	402			
20											
30	323	172	380	98	20	340	193	404			
40											
50	316	190	379	98	20	349	189	412			200 Coke
10 00	318	191	375	98	16						
10					10	339	193	403			
20											
30											
40	332	192	396	98	0	341	192	405			
50											
11 00						334	183	398			
10						338	184	389			
20						336	201	403	200 flour [?]		
30											
40											
50											
12 00											
10											
20											
30											
40											
50											
00											
10											

12

KELSEY-HAYES CANADA LIMIT

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 19/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60	–	450 ~~400~~						
3:02					–	450	200	400	6	(
3:05	Full									
3:18	~~[illegible]~~	160		1st Stone						
3:22	420				200 Coke					
3:26										
3:30					1 Extra Manganese per Charge					2
3:33										2
3:36	/				for 10 Charges					2
3:40	/									2
3:44										2
3:47										2
3:49										2
3:55										2
3:59										2
4:03				1 Silicon Brick off					(5)	2
4:07	420									
4:10		160			200 Coke					
4:15					100 Stone					
4:18										
4:22										
4:28	420				200 Coke					
4:33										
4:35										
4:38										
4:41										
4:44										
4:47										
4:50	Full									

TOTAL MELT .... TOTAL COST ....

APGL - 252

[illegible]

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT 7-2

DATE Jan 19/83 MELTER Cupola #1 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 456	220	60		~~400~~ 450		450	300	400	5	1
5 2 00										
5 03										
5 06										
5 09										
5 13										
5 7 16										
5 19										
5 22										
5 10 26	420	~~Foil~~			200 Coke		Shut Down			
6 11 29										
6 12 32		160			100 Stone					
6 13 35										
6 14 37										
6 15 40										
6 44										
6 48										
6 53										
6 57	420				200 Coke					
7 00										
7 04										
7 07										
7 10										
7 13										
7 16										
7 19										
7 22										
7 26	420				200 Coke					

TOTAL MELT .... TOTAL COST ....

WPBL - 257

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 19/83 MELTER Cupola #18

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 1004	220	60		450 ~~400~~		450	300	400	5	1
1007										
1010										
1012										
1015										
1018	Fill									
1024										
1029										
1032										
1035	Stop									
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Jan 21/82 Day shift

Barometric Pressure 29.7" Hg Dry Bulb Temperature 25°F Wet Bulb Temperature [illegible]

Operating Conditions: [illegible] Temp. [illegible]°F

O_2 Addition: 100 SCFM

[illegible] 16 ([illegible])

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
8 20	7.5	1121	9.0	1283	8.0				2820	1.0	43 ½				
8 40	7.5	1013	10.5	1166	9.0		9.0		2354	1.0	44				
9 00	10.5	1274	9.0	1436	9.5		8.5		2843	1.0	51	2	12.0	10.8	0.8
9 20	8.0	1121	—	1256	7.5		8.5		2771	-	—	9 30 1	12.0	12.0	0.4
9 40	10.0	1112	9.0	1310	8.5		7.5		2738	1.0	53 ½				
10 00	8.5	1166	10.0	1130	6.5		6.5		2773	1.0	54	10 [illegible] 3	7.2	14.8	1.2
10 20	9.5	1025	7.5	1346	8.5		7.0		2792	1.0	46	[illegible] 4	9.0	14.4	1.0
10 40	—	1317	—	1319	8.5		7.0		2751	1.0	47				
11 00	10.0	1317	12.5	1364	11.5	-	8.5		2202	1.0	47				
11 20	12.5	1120	7.5	1301	8.5		8.5		2773	1.0	49 ½	3	11.0	11.0	[illegible]
11 40	7.5	1157	—	1202	-		-		2819	1.0	52	1	[illegible]	[illegible]	[illegible]
Av.	9.3	1164	9.9	1235	8.6		7.9		2797	1.0	[illegible]	[illegible]	11.4 / 9.1	11.1 / 13.6	[illegible] / 0.9

CUPOLA REPORT

CUPOLA No: 8 DATE: Jan. 21/83 SHIFT: Days.

Bed – 63"
- Sand: .... lb. 354" 4 Bags Helspar
- Coke: 6100 lb. 359"
- Lime: 400 lb.

O2 on all day

0 cans carbide.

Start –
- Lit: .... a.m.
- Charge: 625 a.m.
- Blast: 650 a.m.
- Tap: 7:03 a.m.
- Slag: 7:29 a.m.

Stop –
- Charge: .... p.m.
- Blast: .... p.m.
- Drop: .... p.m.

Meltzona: 55 lbs. lb.
Charges: 123 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: 1 hr 55 min %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F

Time	On	Off	Oz (30)	CFM (68)	Reasons for Off	Time	On	Off	Oz	CFM	Reasons for Off
7			27	62		12					
10			27	62	12 TON	10	40 min				
20			32	62	Clean Water Jets	20					
30		X			No Power	30	X		22	68	
40						40			22	68	
50	40 min					50			22	68	
8						1			22	68	
10	X		22	62		10			22	68	
20			22	62		20			22	69	
30			24	63	13 Ton	30			22	67	
40			24	63		40		X	22	67	21 Ton.
50			26	63		50	15 min				
9			26	64		2	X		21	68	
10			26	64		10			21	68	
20			26	64		20			22	68	
30			30	63		30			22	68	20 TON
40			30	64		40		X			
50			30	64		50	20 min				
10			30	64		3					
10			30	64	17 Ton.	10					
20			26	65		20					
30			26	65		30					
40			26	65		40					
50			26	65		50					
11			26	66							
10			26	66		10					
20			26	66		20					
30			27	67	22 TON	30					
40			26	66		40					
50		X	26	66	Clean tuyeres	50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 320 lbs
		TRANSFER LADLES	Fe Si. 85% 220 lbs.
		12 Bags Coke. 13 Bags spout AG 5B-1	
		Cupola Tender Jim [illegible]	

WPL 238

IRON CONTROL REPORT

[illegible] DATE Jan. 21/83

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limes Test Bars, e.t.c.
7 00											R 200 Ck.
10				—	30						R. 5 [illegible]
20	389	164	454	—	34	345	176	404	66		
30											
40						357	172	414	70		
50											
8 00											
10											
20	296	151	346	98	42	344	176	403	70		200 Ck.
30						334	170	391	70		100 [illegible]
40	307	170	366	98	42	337	173	395	70		200 Ck.
50						344	170	401	480 TO FLOOR.		
9 00						342	176	401	70		100 [illegible]
10	321	181	381	98	42	349	173	406	400 T Bar.		
20						343	190		200 T Bar.		200 Coke
30	321	191	385	98	36	353	179	413	70		
40						351	183	412	66		
50	311	158	364	98	42	345	181	405	66		200 Ck.
10 00						348	175	406	70		
10	328	187	390	98	42	358	177	417	70		
20											
30	307	173	367	98	42						200 Ck.
40						354	180	414	66		R. 6 [illegible]
50											100 [illegible]
11 00	317	187	328	98	36	343	182	404	66		R. 210 Ck.
10											
20	318	186	380	98	36	338	183	399	66		
30						342	182	403	66		200 Ck.
40											
50						340	182	401	66		
12 00	313	190	376	98	30						200 Coke
10											
20											
30											
40						358	189	421	50		
50	320	170	377	98	34						200 Ck.
1 00						343	176	402	70		
10											
20											
30	309	197	375	98	30	335	178	394	70		200 Coke
40											
50						338	184	399	66		
2 00											
10						360	189	403	60		
20	314	204	382	98	16						200 Ck.
30						344	187	411	66		
40											
50											
3 00						348	190	411	60		
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 21/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 6 1 25	700	60 / 400	–	450	–	450	300	400	5	1
6 2 29										
6 3 32										
6 4 35										
6 5 38										
6 6 41	Full									
6 7 55										
7 8 00										
7 9 03										
7 10 06										
7 11 09	Full									
7 12 15										
7 13 18										
7 14 21										
7 15 24	Full		power off							
7 16 30										
7 17 40	Full									
8 18 15										
8 19 18										
8 20 21										
8 21 24										
8 22 27										
8 23 30	400		700 Coke							
8 24 33										
8 25 36		110	100 lbs Stone							
8 26 39										
8 27 41										
8 TOTAL 44										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT II

DATE Jan 21/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red.
Bed	200	60								
1 8 47			—	350	—	450	300	400	5	1
2 8 50										
3 8 53										
4 8 56										
5 8 59										
6 9 03		160	100 lbs Stone							
7 9 07										
8 9 10										
9 9 13									1	
10 9 16	400	200 extra Coke							2	
11 9 20									2	
12 9 26									2	
13 9 30									2	
14 9 33									2	
15 9 36									2	
16 9 39									2	
17 9 41									2	
18 9 43									2	
19 9 46									2	
20 9 49									1	
21 9 54										
22 9 57										
23 10 00	400		200 Coke							
24 10 03										
25 10 06										
26 10 09										
27 10 15										
TOTAL 10 48										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT II

DATE Jan 21/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	200	60	–	450	–	450	300	400	5	1
10 1 21										
10 2 24										
10 3 27										
10 4 30										
10 5 32										
10 6 35										
10 7 38										
10 8 43										
10 9 46	400		200	Coke				R 6 Sil Brick		
10 10 49		160	200	lbs Ston						
10 11 52				R 210 Coke						
10 12 55										
10 13 58										2
11 14 03										
11 15 06										//
11 16 09										
11 17 12										
11 18 15										
11 19 18										
11 20 21										
11 21 24										
11 22 27	400		200	extra Coke						
11 23 30										
11 24 33										
11 25 36										
11 26 39										
11 27 42										
11 TOTAL 45										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT ....*........

DATE *Jan 21/83* .... MELTER *Cupola # 8* ....

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges (G4)	Time	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
[illegible]	11 48	210	40	–	450	–	450	300	400	6	2
1	11 51										
2	12 33										
3	12 36										
4	12 39	410		900	Coke						
5	12 42										
6	12 45										
7	12 48										
8	12 51										
9	12 54										
10	12 57										
11	13 00	410		900	Coke						
12	13 03										
13	13 06										
14	1 09										
15	1 12										
16	1 15										
17	1 18	Full									
18	1 24										
19	1 27	410		900	Coke						
20	1 30										
21	1 33										
22	1 36										
23	1 39										
24	1 42										
25	1 44	Full									
26	14 00										
27	2 03										
TOTAL	2 06										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 21/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 112	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	210	60								
2 09			–	450	–	450	300	400	6	2
2 2 12										
2 3 15										
2 4 18										
9- 5 21										
2 6 24										
2 7 27	400		200	Coke					2	1
2 8 30										
2 9 33										
1 10 36	Full									
1 11 41	Full									
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

1983

TOTAL MELT .... TOTAL COST ....

APGL - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Jan. 21/82 NIGHT SHIFT

Barometric Pressure 29.6" Hg Dry Bulb Temperature 27°F Wet Bulb Temperature Not Found

Operating Conditions: Blast Air Temp. 60°F

O_2 Addition: 100 SCFM

Tuyeres. 16 (2.75 in x 2.75 in)

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
15:20	7.5	1229	6.0	1053	5.5		5.0		2727	1.3	39 1/2				
15:40	7.5	1256	9.5	1143	6.0		5.5		2786	1.3	42 1/2	15:50 2	7.3	14.6	1.4
16:00	9.5	1202	8.0	1202	7.5		7.0		2326	1.4	39	3	5.0	15.6	0.9
16:20	8.5	1074	9.0	1256	7.5		7.5		2816	1.3	42				
16:40	9.0	1193	9.5	1256	7.0		8.5		2846	1.3	37	4	8.8	14.8	0.4
17:00	10.0	1580	9.0	1470	5.5		8.0		2858	1.3	38	16:45 1	7.2	11.2	0.4
17:20	8.5	1372	10.0	1229	7.5		7.5		2886	1.3	41 1/2				
17:40	–	1202	8.5	1490	8.0		–		–	–	–	2	7.3	12.6	1.0
AVE.	8.6	1266	8.7	1266	6.8		7.0		2821	1.31	40.2	TOP BOTTOM	8.7 8.4	12.8 15.2	0.9 0.6

CUPOLA REPORT

CUPOLA No: (8) DATE: Jan 21 '83 SHIFT: night

Bed –
Sand: .... lb.
Coke: .... lb.
Lime: .... lb.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: .... a.m.
Tap: .... a.m.
Slag: .... a.m.

Stop –
Charge: 10.47 p.m.
Blast: 11 20 p.m.
Drop: 11 27 p.m.

Ozon all night.
0 carbide.
Drop nil
14 BOXES HELSPOT (LADLES)

Meltzona: .... lb.
Charges: 112 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: ....
TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off
3	5	X			16 ton
10			22	68	
20			22	68	
30			22	69	
40			22	69	
50			22	69	
4			22	69	
10			22	69	
20			22	69	
30			22	69	20 ton
40			22	69	
50			22	69	
5			22	69	
10			22	69	
20			22	69	
30			21	69	
40		X	21	69	
50	20				
6	X				
10			20	69	
20			20	69	
30			20	69	
40			20	29	
50			20	69	
7	5	X	20	69	Hole in end of
10			19	69	long trough
20			18	69	
30			18	69	23 ton
40			18	69	
50			18	69	

Time	On	Off	Oz.	CFM	Reasons for Off
8			18	69	
10		X	19	69	
20		X			
30	10				
40					
50					
9	X				
10			16	69	
20			18	69	
30			19	69	
40			19	69	
50			19	69	
10			18	69	
10			18	69	
20			20	69	
30			20	69	
40			20	69	
50			10	62	
11			9	62	
10			8	58	
20		X	7	58	
30					
40					
50					
12					13 TON
10					
20					
30					
40					
50					

Type of Drum	Cans of Alloy	SPOUT / TRANSFER LADLES	
			Fe Si. 85% 30 lbs.
			Fe Si. 85% 150 lbs.
		23 Coke	13 Spar
		AG5T3	Cupola Tender [signature]

WPL 236

8) [signature]

IRON CONTROL REPORT

DATE Jan 21/83 [illegible]

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limestone Test Bars, e.t.c.
3 00											R.210 Coke
10				98	20	338	181	402			R-6 [illegible]
20	297	163	351	98	20						200 Coke
30											
40	325	184	386	98	20	339	194	404			100 [illegible]
50											
4 00											
10	329	210	389	98	10	346	194	411			200 Coke
20											
30	318	193	382	98	10	361	197	427			
40											R.5 [illegible]
50	323	210	393	98	0	349	199	415			
00						345	204	413	200	flour	200 Coke
10	317	193	381	98	0	336	208	404			
20											
30	318	188	381	98	10	343	193	407			R220 Coke
40											200 Coke
50	326	188	389	98	0	341	200	408			
00											
10						334	197	400			100 stone
20	306	185	368	98	0	335	196	403			
30						345	196	410	200	flour	
40	313	178	372	98	0	335	195	400			200 Coke
50											
00	317	187	379	98	0	342	190	404			
10						342	194	407	200	TB	
20	314	187	381	98	0	338	194	403			200 Coke
30						345	196	408			R230 Coke
40											
50	317	199	383	98	0	348	199	411			
8 00											
10	325	183	379	98	0	353	188	416			
20											
30	321	173	379			345	191	409			
40											
50											
00											
10	322	216	374	98	0	353	188	416			100 stone
20											
30	317	197	381	98	0	347	197	412			R4 [illegible]
40											
50	327	198	389	98	0	343	193	407			
10 00											
10	309	178	368	98	0	358	188	421	2		200 Coke
20											
30	315	184	376	98	—						
40	306	182	377	98	0	341	190	404			
50						345	194	400	200	flour	
11 00				98	0	341	190	404			
10											
20				0	0	350	188	413			
30						353	187	410			
40											
50											
12 00											
10											
20											
30											
40											
50											
00											
40											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 21/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	910	60								
3:10			—	450	—	450	300	400	6	1
3:13										
3:17	410	160			200 Coke					
3:19					[illegible]					
3:23										
3:26										
3:29										
3:35										
3:39										
3:43										
3:45										
3:48										
3:51										
3:54										
3:56										
4:02										
4:05										
4:08										
4:11										
4:14	410				200 Coke					
4:19										
4:21			64							
4:24										
4:27										
4:30										
4:34					253					
4:36				122	26					
4:43	410			112	200 Coke					

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 21/83 MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

1 Silicon Brick [illegible]

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 446	210	60	—	450	—	450	300	400	5	1
450										
453										
455										
459										
504										
507										
510										
513										
516										
519	220			10 lbs Coke Added						
524	420			200 Coke						
528										
530										
533										
537										
539										
543										
545										
605										
609										
613										
619										
622		160			100 Stone					
626										
632										
635										
640	420				200 Coke					

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 21/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 6:44	220	60	—	450	—	450	300	400	5	1
6:48										
6:53										
6:59										
7:03										
7:06										
7:09	[illegible]									
7:15										
7:19	420			20 coke						
7:22	230			10 lbs coke Added						
7:25										
7:28	[illegible]									
7:31										
7:37										
7:40										
7:43										
7:46										
7:49										
7:53										
7:56	[illegible]									
7:59										
8:05										
8:11	[illegible]									
8:15										
9:03										
9:06										
9:09										
TOTAL 11		160			10 D Stop					

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 21 /82 MELTER Cupola #8

Wind On ✓ A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 81	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 9 14	230	60	—	450	—	450	300	400	5	1
9 18										
9 21										
9 24										
9 26										
9 29										
9 32										
9 35										
9 38									(4)	
9 42	Fuel			Silicon Brick off						
9 49										
9 52										
9 55										
9 59	470			200 coke						
10 02										
10 05										
10 08										
10 13										
10 17										
10 20										
10 23										
10 27										
10 30										
10 34										
10 38										
10 41										
10 44										
10 47										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD.

SECTION 'F': DATA SHEETS FOR GROUP IV TESTS
(TUYERE VELOCITY = 200 SFPS)

CUPOLA TESTS FOR JAN 26 83 & 8

TIME	% T.C	% S	C.E
7:15	3.82	1.75	4.40
7:27	3.49	1.78	4.08
7:43	3.17	1.82	3.78
8.00	3.17	1.93	3.81
9.09	3.07	1.61	3.61
9.26	3.06	1.67	3.62
9.47	3.24	2.04	3.92
10:17	3.28	2.02	3.95
10:32	3.09	1.71	3.66
10:50	3.14	1.65	3.69
11:18	3.15	1.93	3.79
11:36	3.19	1.87	3.81
12:50	3.17	1.70	3.80
13:28	3.02	1.89	3.65
14:19	3.19	1.89	3.82
15:12	3.09	1.75	3.68
15:27	3.32	1.83	3.93
15:49	3.20	1.95	3.85
16.11	3.03	1.81	3.63
16.28	3.15	1.85	3.77
16:47	3.19	1.94	3.84
17.13	3.14	1.88	3.77
17.29	3.21	1.83	3.82
18:17	3.33	1.73	3.91
18:27	3.26	1.67	3.82
18:46	3.33	1.86	3.95
19:00	3.04	1.88	3.67
19:37	3.05	1.82	3.66
19:51	3.10	1.77	3.69
20:15	3.08	1.82	3.69
21:11	3.37	2.14	4.08
21:20	3.21	1.77	3.80
21:38	3.35	1.73	3.93
21:54	3.30	1.68	3.86
22:36	3.39	1.72	3.96
22.51	3.21	1.70	3.78

CUPOLA REPORT

CUPOLA No: 8 DATE: Jan. 26/83 SHIFT: Days

Bed 64"
Sand: lb.
Coke: 5600 lb.
Lime: 460 lb.
Start –
Lit: a.m.
Charge: 630 a.m.
Blast: 6:41 a.m.
Tap: 655 a.m.
Slag: 7:25 a.m.
Stop –
Charge: p.m.
Blast: p.m.
Drop: p.m.

35-1" 35-9" 4 Box Hotspot
O2 on all day.
0 cans carbide

Meltzona: 4500 lb.
Charges: 132. tons
Poured: tons
Hours Melted: hrs.
Tons per hour: tons
Cupola Loss: 1 hr 10 min %
Coke Ratio: TO
Weather:
Humidity: %
Temperature: degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
			27	68							
7			29	61	10 TON	12					
10			30	60	Clean Water Jets	10	35 min.				
20			30	59		20					
30			31	59		30	X		25	69	
40			30	61		40			24	68	22 Ton.
50			29	62		50			27	68	
8			29	62		1			27	67	
10			30	61		10			27	66	
20			30	61		20			27	65	
30			28	62		30			27	66	19 Ton.
40			28	62		40		X	27	66	
50			29	62		50	15 min				Clean Water Jets
9			29	62	13 TON	2	X		23	69	
10			29	62		10			25	69	
20			29	62		20			26	69	
30			30	62		30			26	69	
40			28	62	17 Ton.	40		X	26	68	22 Ton.
50			28	63		50	20 min.				
10			29	63		3					
10			29	63		10					
20			28	63	Clean Water Jets	20					
30			28	63		30					
40			28	63	19 Ton.	40					
50			28	63		50					
11			28	63							
10			29	64		10					
20			29	63		20					
30			29	64	17 Ton.	30					
40			28	64		40					
50		X	28	45		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 190 lbs.
		TRANSFER LADLES	Fe Si. 85% 240 lbs.

Coke 40-25 Spec. 19 A652-1

Cupola Tender [signature]

CUPOLA REPORT

CUPOLA No: (5) DATE: Jan 26/83 SHIFT: night

Bed –
Sand: .... lb. O on all night
Coke: .... lb.
Lime: .... lb. O carbide

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: .... a.m.
Tap: .... a.m. 2 charges drop.
Slag: .... a.m.

Stop –
Charge: 10.56 p.m.
Blast: 11 20 p.m. 13 BOXES HEISTER (LADLES)
Drop: 11 36 p.m.

Meltzona: .... lb.
Charges: 120. tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off
3	X				18 Ton
10			25	70	
20			25	69	
30			25	69	
40			26	69	
50			25	69	
4			25	69	22 Ton
10			25	69	
20			25	69	
30			24	69	1½ oz sil/min.
40			24	69	
50			24	69	
5			24	69	
10			25	70	
20			25	70	
30			25	70	23 Ton
40		X	25	70	2 oz. sil/min.
50	15				
6	X				
10			25	70	
20			25	70	
30			25	70	25 Ton
40			25	70	
50			25	70	
7			25	70	
10			25	70	
20			25	70	2 oz sil.
30			25	70	
40			24	70	
50			23	70	

Time	On	Off	Oz.	CFM	Reasons for Off
8			23	70	bricks out of trough (4)
10			23	70	
20		X	22	70	
30					
40	45				
50					
9	X				23 Ton.
10			25	70	
20			25	70	
30			25	70	
40			22	70	
50			22	70	1 oz sil/min.
10			23	70	
10			23	70	
20			22	70	23 Ton
30			23	70	
40			23	70	26 Ton.
50			23	70	Slags running
11			23	70	under bridge - 4
10			17	65	bricks out of trough
20		X	10	65	HOLE IN DAM
30					SLAG RUN [illegible] DROP BOTTOM
40					
50					
12					
10					
20					
30					
40					
50					

14 Ton

Type of Drum	Cans of Alloy	SPOUT	Fe Si. 85% 50 lbs.
		TRANSFER LADLES	Fe Si. 85% 175 lbs.

24 Bag #40 – 7 Bag - Spar
1 Bag 465 R..
Cupola Tender [signature]

WPL 238

I..ON CONTROL REF)RT

DATE: [illegible] 26 / 8 [illegible]

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limes Test Bars, e.t.c
7 00			467		30						R.200 [illegible]
10	382	175	441	–	34	334	182	395			R.5 [illegible]
20						358	175	416	66		
30	349	178	408	98	38						200 [illegible]
40						348	178	407	70		
50	317	182	379	98	38						
8 00					38 8oz	337	184	398	66		
10	317	193	381	98	32	349	196	441	66		R.220 [illegible]
20											
30						348	190	411	50		
40						340	204	408	200TB		
50	308	173	366	98	32.	369	182	410	400TB [illegible]		
9 00					32 5oz						200 [illegible]
10	307	161	361	98	39	348	181	408	66		
20						345	177	404	70		
30	306	167	.362	98	40						200 Coke
40					44	345	170	402	70		
50	324	204	392	98	40						
10 00						356	178	415	66		
10				20		367	186	429	60		
20	328	202	395	~~98~~	~~40~~	371	187	437	50		
30				–	28	361	187	423			
40	309	171	.365	–	32.	363	180	423			
50	314	165	369	98	32 6oz	354	183	415			
11 00					36	337	180	397	66		200 [illegible]
10											
20	315	193	379	98	32	346	183	407	66		
30						349	180	409	400 T Bar.		
40	319	187	381	98	32						
50						343	183	403	66		200 [illegible]
12 00											
10											
20											
30						335	191	399	.60		
40						340	192	404	50		
50	317	190	380	98	26						200 [illegible]
1 00						337	188	400	66		TEMP 2738
10											
20						341	181	401	66		
30	301	189	365	98	4oz 26.	341	183	402	66		200 [illegible]
40						337	187	399	66		
50											
2 00				–	20						
10						373	191	437	50		
20	319	199	392	–	20	385	185	447	30		
30						372	191	436	30		
40						369	188	432	30		
50						361	188	424	50		
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

(8) [illegible]

IRON CONTROL REPORT

DATE Jan 26/83 [illegible]

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limest Test Bars, e.t.c.
3 00						355	185	417.	[illegible]	200	H. 220 Coke R. 5 [illegible]
10	371	209	441	98	20						
20	309	175	368	98	20	348	187	410			
30											
40	332	183	393	98	20	366	187	428			
50						348	187	410.			
4 00						366.	191	430	200	floor	
10	320	195	385	98	10	352	186	414			
20						342	197.	408.	200	1B	
30	303	181	363	98	10	345	180	405			200 Coke
40											
50	315	185	377	98	10	336	182	397.			
5 00						338	184	399	400	floor	
10	319	199	384	98	10	332	188	395.	344/202/401(2)		200 Coke
20						341	186	403			
30	314	188	377	98	10	345	182	406			100 stone
40											200 Coke
50	321	183	382	98	10	344	189	407			
6 00											
10				98	10	340	184	401			
20	333	173	391	98	10	337	189	400			
30											
40	326	182	382	98	10	346	180	409			200 Coke
50											
7 00	333	186	395	98	10	351	188	419			
10											
20	304	188	367	98	10	342	184	404			200 Coke
30						335	185	397			
40	~~305~~	~~182~~	~~366~~	~~98~~	~~10~~						
50	305	182	366	98	10.	341	183	402			R. Test.
8 00						347	194	409	200	floor	
10	310	177	369	98	20.	339	186	401			200 Coke
20											
30	308	182	369.			337	183	398			
40											
50											
9 00											
10	337	214	408	98	14	345	182	406			
20											
30	—	—	380	98	14	346	189	409			
40						358	182	419.	400	floor	
50	335	173	393	88	14	345	187	407			200 Coke
10 00											
10	330	168	386	98	25	347	182	408			
20						347	197	403	200	floor	
30											
40	339	172	376	98	[illegible]	339	181	399			
50											
11 00	321	170	378	98	26	343	179	403			
10											
20						348	175	406			
30											
40						340	180	400			
50											
12 00											
10											
20											
30											
40											
50											
00											
10											

.ELSEY-HAYES CANADA L.MITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 26/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	900	60								
6 1 27		400	—	450	—	450	300	400	5	1
6 2 30										
6 3 33										
6 4 36										
6 5 39	Full									
6 6 49	Full									
6 7 53										
6 8 56	Full									
7 9 03										
7 10 09										
7 11 12										
7 12 15	Full									
7 13 19										
7 14 22										
7 15 25										
7 16 30	Full									2
7 17 36	400		700	Coke						
7 18 39										
7 19 45										
7 20 48										
7 21 51										
8 22 55										
8 23 59										
8 24 03										
8 25 06										
8 26 09										
8 27 12							B	920	Coke	
8 TOTAL 14										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT : #1 .

DATE Jan 26/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

28 Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	920	60								
8 1 17			—	450	—	450	300	400	5	2
8 2 20	Full									
8 3 28										
8 4 31										
8 5 34										
8 6 36										
8 7 39										
8 8 42										
8 9 45										
8 10 48										
8 11 51		Full								
8 12 56										
8 13 59	420		200	Coke						
9 14 06										
9 15 09										
9 16 12										
9 17 15										
9 18 18										
9 19 21										
9 20 24	Full									
9 21 30										
9 22 33										
9 23 36	420		200	Coke						
9 24 39										
9 25 42										
9 26 45										
9 27 48										
9 TOTAL 51										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 26/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	120	60	–							
9 1 54				450	–	450	300	400	5	2
9 2 58										
10 3 01										
10 4 06										
10 5 09										
10 6 12										
10 7 15										
10 8 18										
10 9 21										
10 10 24										
10 11 28										
10 12 31										
10 13 34										
10 14 37										
10 15 40										
10 16 43										
10 17 46										
10 18 49	Full									
10 19 55										
10 20 58										
11 21 01										
11 22 06										
11 23 10										
11 24 13	420		200	Coke						
11 25 16										
11 26 19										
11 27 22										
11 28 25										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 26/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquete	Cast Iron Scrap	Steel Scrap	Ucar Briquete Metallic	Manganese Briquete Red
Bed	220	60	—	450		450	300	400	5	2-
(1) 11 28										
(2) 11 32										
(3) 11 35										
(4) 11 38										
(5) 11 41										
(6) 11 44										
(7) 11 47	420		200 Coke							
(8) 11 50										1
(9) 11 55	Full									
(10) 12 29										
(11) 12 32										
(12) 12 35										
(13) 12 38										
(14) 12 42										
(15) 12 44										
(16) 12 47										
(17) 12 50										
(18) 12 53										
(19) 12 56										
(20) 1 00	420		200 Coke							
(21) 1 06										
(22) 1 09										
(23) 1 12		9-60		200 Ex Lime Stone ← Feeder not working right.						
(24) 1 15										
(25) 1 18										
(26) 1 23										
(27) 1 26										
(TOT) 1 29										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

..ELSEY-HAYES CANADA L..MITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 26/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 112	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60								
1 1 32	Full		–	450	–	450	300	400	5	1
1 2 37	420		200 Coke			260 Ex Lime Stone				
1 3 40										
1 4 43					Feeder not working right.					
1 5 46	Full									
2 6 06										
2 7 09										
2 8 12										
2 9 15										
2 10 18										
2 11 20										
2 12 23										
2 13 26										
2 14 29										
2 15 32										
2 16 35										
2 17 38										
2 18 41										
2 19 44										
2 20 46	Full									
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 26/88 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60								
3:07			–	450	–	450	300	400	5	1
3:10										
3:14										
3:17										
3:19										
3:22	Fill									
3:29										
3:33										
3:37										
3:40										
3:43										
3:47										
3:50										
3:53										
3:55										
4:02										
4:06										
4:10										
4:13										
4:17										
4:21	420				200	Cok				
4:24										
4:27										
4:30										
4:33										
4:35										
4:37										
TOTAL 4:40										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 26/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 443	220	60	—	450	—	450	300	400	5	1
446										
449										
452	420				200 Coke					
455										
458										
5 7 01										
504										
5 9 07										
5 10 10										
5 11 13										
5 12 19										
5 13 22										
525										
5 15 29										
5 16 32										
5 17 34										
5 18 38	420	160			100 Stone					
5 19 41	Full				200 Coke					
5 20 55										
6 21 05	Full									
6 22 10	Full									
6 23 15										
6 24 19										
6 25 21										
6 26 25										
6 27 28										
6 TOTAL 30										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 26 /83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
634	220	60	—	450	—	450	300	400	5	1
638	420			200 Coke						
641										
645										
648										
652										
655										
658										
701										
706										
710	420			200 Coke						
714										
718										
721										
725										
729										
732										
735										
739										
742	Fe 11									
744										
752					1 Silicon Brick off				(4)	
755					200 Coke					
758	420									
802										
804										
809										
TOTAL 812										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

Kelsey-Hayes Canada Limited
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 26/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M. .F.M.

Charge 87	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red	Manganese Briquets Red
Bed											
815	220	60	–	450	—	450	300	400	4	1	1
818	[illegible]										
821		Shut Down									
907											
911											
914											
916											
920											
923											
925											
928											
933											
936											
940											
943											
947	420				200 Coke						
950											
954											
957											
1000											
1003											
1006											
1009											
1011											
1016											
1019											
1023											
1025											

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date Jan [illegible] DAY SHIFT

Barometric Pressure 29.3 "Hg Dry Bulb Temperature 35°F Wet Bulb Temperature ______

Operating Conditions: BLAST AIR TEMP [illegible]°F

O_2 Addition: 100 SCFM NOTE COKE SCALE [illegible]
10 (25 [illegible] / PIPE [illegible]) [illegible] RIGHT

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
9:40	8.5	1382	9.5	1202	7.5	–	7.0	–	2239	1.8	51				
10:00	7.0	1233	8.5	1255	6.5	–	6.0	–	2885	1.8	51	1 4	6.4 6.2	14.4 14.8	1.2 1.6
10:20	7.5	1229	8.0	1256	7.0	–	7.0	–	–	1.7	52				
10:40	7.5	1382	12.0	1139	6.5	–	8.5	–	2864	1.6	47				
11:00	9.0	1130	8.0	1202	6.0	–	8.0	–	2844	1.6	43 1/2	2 3	11.2 6.8	6.2 13.3	1.2 [illegible]
11:20	6.5	1382	8.0	1346	6.5	–	6.0	–	2856	1.6	46				
11:40	8.0	1193	9.5	–	–	–	6.0	–	2873	–	–				
12:00	12.0	1292	7.5	1202	–	–	–	–	2856						
·12:10												2 4	7.0 6.4	11.2 13.3	2.8 0.2
AVE.	8.8	1279	8.9	1243	6.7	–	6.9		2860	1.68	43.4	TOP BOTTOM	8.2 6.5	10.6 14.1	1.7 [illegible]
										BLAST AIR					
											6535 SCFM				

CUPOLA REPORT

CUPOLA No: 8 DATE: Jan. 28/83 SHIFT: Days

Bed 24"
Sand: .... lb. 35' 1" 4 Bop
Coke: 4000 .... lb. 35' 9"
Lime: 400 .... lb.

Start –
Lit: .... a.m. O2 on all day.
Charge: 6:30 .... a.m. 26 Cans carbide
Blast: 6:45 .... a.m.
Tap: 6:58 .... a.m.
Slag: 7:32 .... a.m.

Stop –
Charge: .... p.m. Coke scale not working right
Blast: .... p.m.
Drop: .... p.m.

Meltzona: 7000 lb
Charges: 121 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: 1 hr. 10 Min %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F

Time	On	Off	Oz. (27)	CFM (69)	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			29	65		12	10 min X		26	62	
10			31	62	17 Ton.	10			26	68	
20			31	62		20		X			17 Ton.
30			31	62	Clean Water Jets	30	15 min X				
40			31	62		40			25	69	
50			31	62		50			27	66	
8			31	62		1			27	64	
10			30	63		10			27	65	
20			29	63		20			27	64	
30			29	63		30			27	64	
40			29	64		40			27	65	16 TON
50			29	63		50			27	65	
9		X	28	62	21 TON	2			27	65	
10					~~[illegible]~~	10			26	65	19 Ton.
20	30 min					20			26	66	
30	X		27	66		30			26	66	
40			28	65		40		X	26	66	
50			28	64		50	15 mins				
10			28	65		3					
10			28	65		10					
20			28	64	17 Ton.	20					
30			28	64		30					
40			28	64		40					
50			26	62		50					
11			25	62							
10			25	60		10					
20			25	60	Clean Water Jets	20					
30			25	60		30					
40			26	62	17 Ton.	40					
50		X	26	62	Slag will not run	50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 160 lbs
		TRANSFER LADLES	Fe Si. 85% 300 lbs
		Prime 17	STEER-9 AESR-1

Cupola Tender Jim [illegible]

WPL 238

IRON CONTROL REPORT

[illegible] DATE Jan. 28/83

TIME	CUPOLA #8 T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limeston Test Bars, e.t.c.
7 00				—	30						R 200 Ch.
10					36	359	170	416			R 5 Sil Brick
20	402	150	452	—	40						
30						376	164	431			
40	342	174	400	—	44	356	168	412	70		100 lb [illegible]
50	326	191	390	98	34	347	171	404	70		200 [illegible]
8 00					40 [illegible]	344	171	401	70		
10	327	~~183~~	385	98	~~40~~						TEMP 2756
20		191				340	172	397	70		200 lb [illegible]
30	297	~~[illegible]~~	361	98	38						R. 220 lb.
40						339	173	397	70		~~[illegible]~~
50	294	149	344	98	44	343	173	401	70		200 lb [illegible]
9 00	296	174	354			347	172	404	76		200 lb [illegible]
10						341	173	399	70		
20											
30						346	177	405	66		
40	312	146	361	98	46	339	182	400	66		
50						397	173	397	70		Cupola TEMP
10 00	336	199	402	98	36	341	179	400	66		2885
10						345	176	404	70		
20											
30	342	198	408	98	32 [illegible]	358	201	425	200 T [illegible]		
40						354	182	415	66		100 lb [illegible]
50	320	186	382	98	32	343	188	406			200 Coke
11 00				98	32	336	183	397	46		
10						342	178	401	70		
20						344	179	404	70		200 Coke
30	312	191	376	98	30	340	189	403	400 T Bar.		
40					26	340	180	403	50		
50	319	210	389	98	—	345	192	409			200 lb [illegible]
12 00											
10											
20											
30				98	14	356	188	419			
40											
50	328	176	387	98	26	352	189	415	50		
1 00						341	180	404	50		200 lb [illegible]
10	313	183	374	98	26						
20						336	186	378	66		
30											
40	327	177	382	98	30 [illegible]	354	187	416	60		
50											
2 00						349	187	411	60		
10						340	189	403	66		
20	307	168	363	98	38	338	186	400	66		200 lb [illegible]
30						334	181	394	70		
40	319	173	377	98	38						
50						340	183	401	66		
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan 28/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	700	60								
6 1 24		400	-	450	-	450	300	400	5	1
6 2 27										
6 3 30										
6 4 33										
6 5 36	Full									
6 6 51										
6 7 57										
7 8 00	Full									
7 9 06										
7 10 09										
7 11 12										
7 12 15										
7 13 18										
7 14 21										
7 15 26	Full									
7 16 33										
7 17 37										
7 18 40										
7 19 43										
7 20 46		160	100 lbs Stone							
7 21 48										
7 22 57	400	Full	900 Coke							
8 23 00										
8 24 03										
8 25 06										
8 26 09										
8 27 12										
8 TOTAL 15										

121

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT II /

DATE Jan 28/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

25 Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	900	60	—	450	-	450	300	400	5	1
8 1 18										
8 2 21										
8 3 24	Full									
8 4 30										
8 5 33										
8 6 36										
8 7 39								B 920 Coke.		
8 8 44	220.									
8 9 47										
8 10 50										
8 11 53	420		200 Coke							
8 12 56										
8 13 59										
9 14 31	420		900 Coke							
9 15 35			12 Cans Cal Carbide							
9 16 38										
9 17 41										
9 18 44										
9 19 47	Full.									
9 20 53										
9 21 57										
10 22 01										
10 23 04										
10 24 08										
10 25 12										
10 26 15										
10 27 18	Full									
1 TOTAL 25										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT *7 1*

DATE *Jan. 28 /83* MELTER *Cupola # 8.*

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

	56.	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed		220	60	-	450	-	450	300	400	5	1
1	10 28										
2	10 32		160			100 lb stone.					
3	10 36										
4	10 39										
5	10 42										
6	10 45										
7	10 49										
8	10 52	420			12 Cans of Carbide. 200 xtra Coke.						
9	10 55										
10	10 59	Full,									
11	11 08										
12	11 11										
13	11 14	420			200 lbs of Coke						
14	11 17										
15	11 22	FULL									
16	11 29										
17	11 33										
18	11 37										
19	11 40	Full									
20	11 45										
21	11 49	420			200 Coke						
22	11 52										
23	11 55										
24	11 59	Full									
25	12 09										
26	12 12										
27	12 1[illegible]										
TOTAL	12 19										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

84/5/11

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan. 28/83 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

No.	84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed		200 :10	60	–	450	–	450	300	400	5	1
1	12:35										
2	12:38										
3	12:42										
4	12:45										
5	12:48										
6	12:51										
7	12:54										
8	12:57										
9	1:01										
10	1:04										
11	1:07	Full.									
12	1:12	400			200 lbs of Coke						
13	1:15	Full									
14	1:19										
15	1:23										
16	1:26										
17	1:29										
18	1:32										
19	1:37										
20	1:39										
21	1:44		160		100 lbs Stone						
22	1:48										
23	1:51	Full									
24	1:55										
25	1:58										
26	2:01	Full									
27	2:11	Full									
TOTAL	2:15										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

1

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Jan. 28/83. MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge 112	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed	280	60		450		450	300	400	5	1
2:18										
2:20										
2:23										
2:26	400.			200 lbs of Coke						
2:29										
2:31										
2:34	Full,									
2:39				121						
2:42	Full									
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date JAN 28/83 NIGHT SHIFT

Barometric Pressure 29.3" Hg Dry Bulb Temperature 33°F Wet Bulb Temperature NA

BLAST AIR TEMP. 62°F

Operating Conditions:

O_2 Addition: 100 SCFM
16 (2.5 in Ø pipe inserts)

NOTE: CORE SCALE NOT WORKING RIGHT

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
15^{20}	9.5	914	11.0	887	9.5	—	10.0	–	2853	1.8	47				
15^{40}	10.0	950	9.5	995	10.0	–	10.0	–	2358	1.8	47				
16^{00}	12.0	1364	10.0	1256	9.0	–	10.0	–	2851	1.7	48 ½	2 3	11.6 9.0	4.8 11.0	2.8 0.4
16^{20}	10.0	1292	10.0	1184	6.5	–	8.5	–	2257	1.8	48				
16^{40}	8.0	1238	9.5	1301	8.5	–	7.5	–	2858	1.9	46				
17^{00}	7.0	1238	8.5	1319	8.5	–	8.5	–	2850	1.8	43	1 4	6.8 9.8	13.8 7.8	1.4 2.2
17^{20}	–	1391	10.0	–	11.5	–	–	–	2840	1.9	43				
17^{40}	10.5	1166	13.0	1157	10.0	–	8.5	–	–	1.9	43 ½				
18^{00}									2842			2 4	8.2 7.4	10.6 11.2	3.0 1.4
Ave	9.6	1194	10.2	1157	9.2	–	9.0	–	2851	1.83	45.6	TOP BOTTOM	8.9 8.7	9.7 10.0	2.4 1.3
										BLAST AIR	6728 SCFM				

CUPOLA REPORT

CUPOLA No: (8) DATE: Jan 28/83 SHIFT: [illegible]

Bed –
Sand: .... lb.
Coke: .... lb.
Lime: .... lb.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: .... a.m.
Tap: .... a.m.
Slag: .... a.m.

Stop –
Charge: 10.24 p.m.
Blast: 10.56 p.m.
Drop: 11.03 p.m.

O2 on all night
O carbide.
cupola empty
5 [illegible] (Lances)

Meltzona: .... lb.
Charges: 116 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: 50 Min. %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3		X			14 Ton	8			20	70	
10			25	69		10		X	20	70	
20			25	69		20					23 Ton.
30			25	68	17 Ton	30					
40			25	68		40					
50			26	68	Coke & Stone	50					
4			26	68	scaling set	9	X				
10			26	68	working right.	10			20	70	
20			26	67		20			20	70	
30			26	67		30			18	67	
40			26	67	4 oz oil/Min.	40			18	67	
50			26	68		50			18	67	
5			24	69	16 Ton	10			18	67	
10			23	70		10			18	67	
20			23	70		20			18	67	
30			23	70		30			15	65	
40			23	70	19 Ton	40			13	65	
50			21	70		50			10	65	
6			22	70		11					
10			20	70		10					
20			20	70		20					
30			20	70		30					
40			20	70	18 oz oil/Min.	40					
50			20	70		50					
7			20	70		12					15 Ton
10			20	70		10					
20			20	70		20					
30			20	70		30					
40			20	70	[illegible] not	40					
50			20	70	Working	50					

Type of Drum	Cans of Alloy	SPOUT	Fe Si. 85% 475 lbs.
		TRANSFER LADLES	Fe Si. 85% zero lbs.
		23 Prime	7 Spec.
		2 Big A65R.	Cupola Tender [signature]

WPL 236

(8) Harn

IRON CONTROL REPORT

DATE Jan 28/83 [illegible]

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Limesto Test Bars, e.t.c.
3 00						344	180	404			R.220 [illegible]
10				98	30						R 5 20 B3
20	316	168	372	98	30						200 Coke
30	310	161	364	98	34	342	178	401			
40											
50	323	182	384	98	34	358	183	419			
4 00											
10	313	195	378	98	30	341	188	404			
20						339	192	403	200 T B		
30											200 Coke
40	315	180	375	98	30.	329	188	392			
50						327	188	390.			
5 00	323	179	383	98	30	334	184	395			~~[illegible]~~
10											
20	329	153	380	98	34	339	182	400			
30											
40	319	171	376	98	34	344	178	403.			200 Coke
50						335	175	393			
6 00											
10						340	173	398			
20											
30	345	158	398	98	40	347	170	404			100 [illegible]
40											
50	330	161	384	98	40 44	343	169	399			R6 sil.
7 00											
10						339	169	395			
20											
30	312	163	366	98	50	343	168	389			200 Coke
40						338	169	394			
50											
8 00						336	174	399			
10											
20						339	170	396			
30											
40											
50											
9 00											
10	306	174	364	98	50	335	173	393			200 Coke
20											
30	309	178	368	98	50	326	180	386			
40	304	184	370	98	50						
50	320	183	381	98	50	334	173	392			
10 00											
10	324	193	388	98	50.	327	181	387			200 Coke.
20						334	174	392			
30						349	195	414	200	floor	
40						337	173	395			
50						337	183	398			
11 00											
10						344	186	406			
20											
30											
40											
50											
12 00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 28 / 83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangane Briquet Red
Bed										
3 07	220	60	—	450	—	450	300	400	5	1
3 11										
3 14										
3 18	420				200 Coke					
3 22										
3 25										
3 28										
3 31										
3 34										
3 37										
3 43				200 Extra Limestone						
3 45										
3 48										
3 52										
3 56										
4 00										
4 04										
4 06										
4 09										
4 13					200 Extra Limestone					
4 15										
4 16										
4 21	420				200 Coke					
4 24										
4 30										
4 33										
4 36										
4 40										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 28 /83 MELTER Cupola #8

Wind On ✓ A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 4 43	220	60	—	450	—	450	300	400	5	1
4 45										
4 50										
4 53										
4 56										
4 59										
5 05										
5 09										
5 12										
5 10 15										
5 11 18										
5 12 20										
5 13 23										
5 14 25										
5 15 29	420	Fed		200 Coke						
5 16 35										
5 17 38										
5 18 41				200 Extra Lime Stone						
5 19 44										
5 20 47										
5 21 53										
5 22 56										
6 23 02										
6 24 05				200 Extra Lime Stone						
6 25 09										
6 26 12										
6 27 15										
6 TOTAL 18										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 28/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 6:19	Fill 220	60	—	450	—	450	300	400	5	1
6:25		160			100 Stone					
6:28	Fill									
6:34										
6:37										
6:39										
6:44				Silicon Brick added					(6)	
6:48										
6:51										
6:54										
6:57										
7:00										
7:03										
7:06										
7:10										
7:13										
7:16										
7:19										
7:22										
7:25	420				200 Coke					
7:29										
7:32										
7:35										
7:38										
7:41										
7:43										
7:45										
TOTAL 7:4[illegible]										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 28 /85 MELTER [illegible] #

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 753	220	60	—	450	—	450	300	400	6	1
756										
800										
803										
806										
810										
814										
817	Full		[illegible signature]							
903										
907										
911										
913										
916										
919	420			200 Coke						
923										
925										
928										
930										
933	Full									
937										
940										
947	[illegible]									
951										
954										
1000	420					200 Coke				
1003										
1006										
1009										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Jan 28/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 1/12	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
1013	220	60	—	450	—	450	300	400	6	1
1016										
1019										
1024										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date FEB 1/83 DAY SHIFT

Barometric Pressure 29.4 Dry Bulb Temperature 33°F Wet Bulb Temperature ____

Operating Conditions: BLAST AIR TEMP 62°F

O_2 Addition: ~ 90 SCFM
16 (25 - Ø P.P.s ...)

Time	Port #1 % CO_2	Port #1 Temp. °F	Port #2 % CO_2	Port #2 Temp. °F	Port #3 % CO_2	Port #3 Temp. °F	Port #4 % CO_2	Port #4 Temp. °F	Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis Port #	% CO_2	% CO	% O_2
9 20	8.5	986	9.0	1067	7.0	-	7.5	-	2816	1.7	50				
9 40	9.5	1004	9.0	1130	6.5	-	7.5	-	2836	1.7	50	1	7.8 DISCARD	6.2	5.0 ?
10 00	8.5	1382	8.5	1283	6.5	-	6.0	-	2846	1.7	50	9 50 4	7.2	13.0	1.6
10 20	7.5	1544	8.0	1562	7.5	-	6.0	-	2845	1.7	50 ½				
10 40	8.5	842	9.5	1112	6.0	-	6.5	-	2838	1.7	49	2	8.0	11.8	1.0
11 00	8.5	1085	9.0	1157	6.5	-	7.0	-	-	1.7	48	10.45 3	6.8	9.4	1.8
11 20	9.0	-	-	-	-	-	-	-	2813	-	-	1 3	8.4 8.4	7.8 9.4	2.4 2.0
11 40	8.0	1076	9.0	1103	7.5	-	6.0	-	2847	1.7	45				
12 00															
AVE	8.5	1131	8.9	1202	6.8	-	6.6	-	2834	1.7	48.9	TOP BOTTOM	8.2 7.5	9.8 10.6	17 18
										BLAST	AIR				
											6537 SCFM				

CUPOLA REPORT

CUPOLA No: 8 DATE: Feb. 1/83. SHIFT: 1

Bed — 63"

02 m alloy

Sand: .... lb. ~~15 - 9" 401" ABOVE HEARTH~~

Coke: 5800 lb.

Lime: 400 ~~lb.~~ 12 cans sod. carbide

Start —

Lit: .... a.m.

Charge: .... a.m.

Blast: 6:48 a.m.

Tap: 7:04 a.m.

Slag: 7:15 a.m.

Stop —

Charge: .... p.m.

Blast: .... p.m.

Drop: .... p.m.

Meltzona: 95 cc lb.

Charges: 123 tons

Poured: .... tons

~~Hours Melted:~~ .... hrs.

Tons per hour: .... tons

Cupola Loss: .... %

Coke Ratio: ....

TO

Weather: ....

Humidity: .... %

Temperature: .... degrees F.

Time (6:48)	On	Off	Oz. (25)	CFM (70)	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			28	63		12		40 (circled)			
10			28	62		10					
20			30	60	14 TON	20	X		23	68	NO 1 2 6 7 8 TUY. CLOSED ½ WAY
30			30	60		30			25	68	
40			30	62		40			25	68	CHECKED FEEDERS 6 OZ
50			30	62	CHECKED FEEDERS 8 OZ SIL.	50			25	68	
8			28	64		1			25	68	
10			28	64	15 TON	10			25	68	
20			28	64		20			25	68	
30			28	64		30			25	68	
40			28	64	CHECKED FEEDERS 12 OZ — SIL	40			25	68	CHECKED FEEDERS 7 OZ SIL.
50			28	64		50			25	68	NO-3-4-5 TUY. CLOSED ½ WAY
9			28	64		2			23	68	
10			28	64		10			23	68	
20			28	64		20			23	68	
30			27	65		30		X			
40			29	65	CHECKED FEEDERS 10 OZ SIL.	40					
50			28	64		50	30				
10			28	65		3	X				
10			28	60		10					
20			28	64		20					
30			28	64		30					
40			28	65		40					
50			26	66	18 TON	50					
11			28	66	CHECKED FEEDERS 6 OZ SIL.						
10			26	66		10					
20			26	66		20					
30			26	66		30					
40		X	26	66	CLEANING TUYERES	40					
50					OK —	50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 250 lbs.
		TRANSFER LADLES	Fe Si. 85% 150 lbs.
		39 PRIME — 5 SCRAP	
		O'HAGER	Cupola Tendor [signature]

WPL 238

Flow ⑧

IRON CONTROL REPORT

DATE Feb. /83

TIME	CUPOLA #8 Days: T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE, 400 IRON: T.C.	Si	C.E.	200 IRON: Silicon Add	Graphite Add	REMARKS (Temp., Coke, Limes' Test Bars, e.t.c.)
7 00											R 200 Coke
10											5 sil.
20	425	160	478	[illegible]	20	356	179	416			100 stone
30											200 coke
40	338	169	395	98	34	362	176	419			R.210 coke
50											
8 00	336	178	395	98	37	348	176	407			
10											200 coke
20	327	164	378	98	40	349	174	401			
30											
40	327	172	384	98	40	346	168	402			
50						348	186	410	200	flow	
9 00	328	196	393.	98	36.	353	168	409			100 Coke
10											
20	330	178	379.	98.	36	340	177	399.			200 coke
30	310	173	368	98	36 90						
40	312	190	375	98	36	336.	178	395			12 carbide
50											
10 00	319	197	385	98	20	338	186	400			
10											
20	322	174	380	98	34	343	186	405			200 coke
30											
40	325	193	389	98	34	345	186	407		18	
50						340	193	404.	200		
11 00						340.	187	402	400	73	400 Coke
10	329	179	388	98	34	347	183	408			R.220 coke
20											
30	323	164	378	98	36	364	179	424			
40						360	182	420			
50	324	173	382	98	36	351.	178	410			
12 00	328	182	389	98	36.						
10											
20											200 coke
30											
40	344	163.	388	98	36.	364	187	424			
50						356	189	419	200	flow	
1 00	337	172	394	98	36	350	187	412			100 stone
10											200 coke
20	339	177	398	98	36	357	182	418			
30											
40	331	172	388	98	36	363	177	422			
50	344	183	410	98	36.	345	176	403			
2 00	339	191	403	98	36.						
10											
20	338	188	401	98	36	374	177	403			200 coke
30											
40	335	191	399	98	36.	345	182	406			
50											
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 1/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 6:39	900	60 / 400	—	450	—	450	300	408	5	1
6:42										
6:43										
6:48										
6:53										
6:56										
7:00	210				10 lb Coke added					
7:05	Full									
7:14	410				200 Extra Coke					
7:18										
7:22										
7:24	Full									
7:32										
7:35		160			100 Stone					
7:38										
7:42										
7:45										
7:48										
7:52	Full									
7:56										
8:02										
8:06										
8:10	410				200 Coke					
8:17										
8:20										
8:24										
8:27										
8:30										

TOTAL MELT .... TOTAL COST ....

HPGL - 262

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 1 /83 MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 8:33	210	60	(struck out)	450	—	450	300	400	5	1
8:35										
8:3?										
8:41										
8:44										
8:47	410					200 Coke				
8:51										
8:55										
8:58										
9:02										
9:06										
9:09										
9:12	Full									
9:19	410					200 Coke				
9:23										
9:25										
9:30	Full									
9:36										
9:40										
9:44		2				12 Cans Carbide				
9:46		2								
9:49		2								
9:52		2								
9:55		2								
9:58		2								
10:02										
10:05	Full									
TOTAL 10:14	410					200 Coke				

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHEET #1

DATE Feb. 1/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Rod
Bed 1018	210	60	—	450	—	450	700	400	5	1
1021										
1025										
1028										
1031										
1034										
1037	F-1									
1042	F-2									
1049										
1053										
1055	410				200 [illegible]					
1058										
1101										
1105										
1109										
1112										
1115	220	[illegible]	10 LBS MORE COKE							
1118	420									
1125										
1130										
1133										
1136										
1139										
1142										
1146										
1150										
1153										
[illegible]										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 1/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge No.	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquette	Cast Iron Scrap	Steel Scrap	Ucar Briquette Metallic	Manganese Briquet Red
Bed 1219	220	60	—	450	—	450	300.	400	5	1
1223	420			200 Coke						
1226	Full									
1231										
1235										
1238										
1242										
1245										
1248										
1251										
1255		160		100 Stone						
1 12 00	L									
1 13 04	420	Full		200 Coke						
1 14 12	Full									
1 15 16										
1 16 19										
1 17 22										
1 25										
1 29										
1 32										
1 36										
1 38										
1 44										
1 24 48										
1 25 50										
1 26 53										
1 27 57										
TOTAL 201										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 1 /83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges #42	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan. Brique Red
Bed 2:04	220	60	—	450	—	450	300	400.	5	1
2:08										
2:10										
2:13										
2:15										
2:18										
2:23										
2:26										
2:28										
2:33	420.									
2:35	Full			Shut Down						
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date FEB. 1/93 NIGHT SHIFT

Barometric Pressure 29.3" Hg Dry Bulb Temperature 32°F Wet Bulb Temperature NA

Operating Conditions: BLAST AIR TEMP. 64°F

O_2 Addition: - 90 SCFM
16 (2.5 in ∅ Pipe inserts) Tuyere dampers 3, 4, & 5 50% open

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
15[20]	11.5	1337	11.0	1238	11.0	–	10.0	–	2813	1.8	43				
15[40]	14.0	1292	11.0	1049	9.5	–	9.5	–	2831	1.9	42 1/2				
16[00]	11.0	1247	8.0	1274	7.5	–	9.0	–	2827	1.9	42 1/2	1 3	9.0 8.2	4.0 11.0	4.0 0.[illegible]
16[20]	10.5	1310	8.5	1301	7.5	–	8.5	–	2843	1.8	42				
16[40]	10.0	1130	6.5	1148	7.0	–	8.5	–	2842	1.9	42 1/2				
17[00]	8.0	1427	8.5	1499	8.5	–	7.0	–	2835	1.8	42	2 4	8.4 8.6	9.4 12.8	1.4 0.2
17[20]	10.5	941	7.5	1103	6.0	–	7.0	–	2783	1.8	41				
AVE.	10.8	1241	8.7	1230	8.1	–	8.5	–	2825	1.84	42.2	TOP BOTTOM	8.7 8.4	6.7 11.9	2.7 0.2
										BLAST AIR					
											6684 SCFM				

CUPOLA REPORT

CUPOLA No: 8 DATE: Feb. 1/83 SHIFT: night

Bed –
Sand: .... lb.
Coke: .... lb.
Lime: .... lb.

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: .... a.m.
Tap: .... a.m.
Slag: .... a.m.

Stop –
Charge: 11:18 p.m.
Blast: 11:55 p.m.
Drop: 12:05 p.m.

12 cans Carbide
7 Boxes Helspot
Borrels.
Cupola empty.

Meltzona: .... lb.
Charges: 124 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: .... TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3	15 min				20 TON	8			22	68	
10						10			22	68	
20	X		23	68	Clean Water Jets	20		X	21	68	
30			27	68		30	40 min.				
40			23	68		40					
50			23	68		50					
4			24	68		9	X		22	68	
10			23	68		10			22	68	24 Ton.
20			23	68		20			22	68	
30			23	68		30			22	68	Clean Water Jets
40			23	68		40			22	68	
50			23	68		50			22	68	
5			23	68		10			22	68	Bucket coming out of trough
10			23	68		10					
20			23	68	Clean Water Jets	20	15 min	X			~~22 Ton~~
30			22	68	23 TON	30	X	X			Cap up.
40		X				40	15 min				
50	25 min					50	X		21	68	
6	X					11			22	68	
10			22	68	Coke + lime stone scale not working right.	10			20	68	
20			22	68		20			20	68	
30			22	69		30			16	64	
40			22	68	22 Ton.	40			13	64	
50			22	68		50		X	10	60	
7			22	68		12					
10			21	68		10					
20			21	68		20					
30			21	68		30					
40			21	68		40					
50			21	68		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 80 lbs.
		TRANSFER LADLES	Fe Si. 85% 230 lbs.
		Coarse – 19 Fine 21 Spec. 4	
		Cupola Tender [signature]	

WPL 238

IRON CONTROL REPORT

Jim K[illegible] night — DATE. Feb 1/83

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limest Test Bars, e.t.c.
3 00						345	181	405	66		R. 220 Ck
10											2. 5 oil Bars
20				98	34						
30						347	187	409	60		
40	349	183	410	98	34						
50						346	183	407	66		100 lb [illegible]
4 00	350	183	411	20	34	346	185	411	200 lb [illegible]		
10											
20	340	181	402	98	34 8 oz.	344	182	402	66		
30											
40						345	183	406	66		
50	340	183	401	98	34						
5 00						346	180	406	66		200 [illegible]
10	339	184	400	98	34						100 lb [illegible]
20						348	181	408	66		200 [illegible]
30	337	177	386	98	38 12 oz						
40						338	182	398			
50											
6 00											
10						344	188	407	60		
20											
30	337	184	402	98	32						
40					32 6 oz.	344	187	406	60		
50						349	189	412	60		
7 00	336	184	401	98	26						200 [illegible]
10						352	187	414	60		
20											
30	344	191	408	98	24						
40						347	190	410	50		
50					24 4 oz.						
8 00	343	181	403	98	28	35?	186	415	66		
10											
20	325	182	386	98	28	349	188	412	66		200 Coke
30											
40											
50											
9 00						342	183	403	66		
10											
20	334	174	392	98	34	347	181	407	66		2 [illegible]
30											
40	331	180	391	98	34	356	185	418	60		200 Coke
50						355	185	412	60		
10 00											
10	333	172	397	98	34 7 oz. 36	341	182	402	66		
20											
30											
40						339	185	401	66		
50											
11 00				95	30	340	180	403	50		
10	318	169	376	98	40						200 [illegible]
20						345	186	401	66		
30				97	36	343	187	405	66		
40						352	184	413	66		
50						351	187	413	60		
12 00											
10						355	186	417	60		
20											
30											
40											
50											
1 00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Feb. 1 /83 MELTER Cupola #

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan. Brique Red
Bed										
3 1 18	220	60	—	450	—	450	300	400	5	1
3 2 21										
3 3 24										
3 4 27										
3 5 30										
3 6 33										
3 7 37										
3 8 42										
3 9 45										
3 10 48										
3 11 51										
3 12 54										
3 13 58		160	100 lbs Stone							
4 14 00										
4 15 03										
4 16 09										
4 17 12										
4 18 15										
4 19 18										
4 20 21										
4 21 24										
4 22 27										
4 23 30										
4 24 36										
4 25 39										
4 26 41										
4 27 43										
4 TOTAL 46										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT ~~II~~ 2

DATE Feb 1/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges (28)	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60	—	450	—	1458	300	2400	5	1
4 1 49										
4 2 52										
4 3 55										
4 4 57										
5 5 00										
5 6 03										
5 7 06										
5 8 09										
5 9 12	420		900 Coke							
5 10 15										
5 11 18	(39)									
5 12 21										
5 13 24										
5 14 28		160	100 Limestone							
5 15 31										
5 16 34										
5 17 37	420			200 Coke						
5 18 40	FULL									
6 19 06										
6 20 09										
6 21 12										
6 22 15										
6 23 18										
6 24 21										
6 25 24										
6 26 27										
6 27 30										
6 TOTAL 33										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

X

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE FEB 1 /83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60	—	450	—	400	300	400	5	1
6 1 36										
6 2 39										
6 3 42	Full									
6 4 47										
6 5 50										
6 6 53										
6 7 56										
6 8 59										
7 9 03										
7 10 06										
7 11 09		160	100 lbs Lime Stone							
7 12 12										
7 13 15	Full									
7 14 21										
7 15 24										
7 16 27										
7 17 30										
7 18 33										
7 19 36										
7 20 39										
7 21 42										
7 22 45										
7 23 48										
7 24 51										
7 25 53										
7 26 56										
7 27 59										
8 TOTAL 03										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE FEB 1 /83 MELTER Cupola #5

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	920	60	—	450	--	450	300	400	5	1
8 1 06										
8 2 09										
8 3 12										
8 4 15										
8 5 18										
8 6 21	Full									
9 7 00	420		200 Ex Coke							
9 8 03										
9 9 06										
9 10 09										
9 11 15										
9 12 18										
9 13 21										
9 14 24										
9 15 27										
9 16 30 x	420		200 Coke			12 Cans Cob Carbide				
9 17 36 x										
9 18 39 x										
9 19 42 x										
9 20 45 x										
9 21 48 x										
9 22 51										
9 23 54	420		200 Coke							
9 24 57										
10 25 00										
10 26 03										
10 27 06										
10 TOTAL 09										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE FEB 1/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 117	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	220	60	–	450	–	450	300	400	5	1
10 1 15										
10 2 30										
10 3 33										
10 4 52										
10 5 55										
10 6 58										
11 7 02										
11 8 06										
11 9 09										
11 10 12										
11 11 15										
11 12 18	~~[illegible]~~ 420		900 Coke							
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

124

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD.

SECTION 'G': DATA SHEETS FOR GROUP V TESTS
(TUYERE VELOCITY = 140 SFPS)

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date FEB. 11/83 MORNING SHIFT

Barometric Pressure — Dry Bulb Temperature 20°F Wet Bulb Temperature N/A

Operating Conditions: 3" DIA. INSERTS

BLAST AIR TEMP. = 50°F

O_2 Addition: -100 SCFM

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
9:40	11.0	1112	9.0	1202	8.0	–	7.0	–	2752	1.7	45½				
10:00	11.0	842	8.0	1166	7.0	–	8.0	–	2779	1.8	44				
10:20	10.0	1130	9.0	1346	7.0	–	7.0	–	2789	1.7	45				
10:40	9.0	1130	7.5	1427	–	–	7.0	–	–	1.8	43½				
11:00	9.0	1112	8.0	1310	7.0	–	8.5	–	2802	1.7	39	2	8.0	16.0	3.0
11:20	7.0	1112	8.0	1130	7.0	–	6.0	–	2825	1.7	41	4	8.2	1.8	17.6
11:40	8.5	–	8.5	1184	–	–	6.0	–	–						
	(11:45	BLOWER		OFF)											
AVE.	9.4	1073	8.3	1252	7.2	–	7.1	–	2790	1.73	43.0	TOP BOTTOM	8.0 8.2	16.0 17.6	3.0 1.8
										BLAST AIR					

CUPOLA REPORT

CUPOLA No: 8 DATE: Feb 11/83 SHIFT: 1

Bed – 62"
Sand: .... lb. O2 on all DAY / 12 cans cat carbide
Coke: 5500 lb.
Lime: 400 lb. 45-9" 40 1" 5 BOX HELS POT

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: 650 a.m.
Tap: 705 a.m.
Slag: 725 a.m.

Stop –
Charge: .... p.m. 6 BOXES HELS POT.
Blast: .... p.m.
Drop: .... p.m.

Meltzona: 6000 lb.
Charges: 113 tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: ....
TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
6 50			30	68							
7			26	68		12					
10			26	68	15 TON	10					
20			26	67		20	60				
30			26	65		30					
40			28	63		40	X		20	66	
50			28	63	CHECKED FEEDERS 1 OZ SIL.	50			20	66	CHECKED FEEDERS 5 OZ SIL
8			28	62		1			20	66	
10			28	63		10			20	66	
20			30	62		20			21	66	
30			30	62		30		X	21	66	27 TON
40			30	62		40					
50			30	66	CHECKED FEEDERS 3 OZ SIL.	50	40				
9			30	66	2700° FROM LADLE TRUCK	2					
10		X	30	60	CHECKING STORE HOPPER.	10	X		26	66	
20						20			20	66	
30	25					30		X	20	66	28 TON
40	X		26	66		40					
50			26	66	CHECKED FEEDERS 4 OZ	50	30				
10			25	66		3	X				
10			24	66		10			~~20~~	~~66~~	
20			24	66		20			~~20~~	~~66~~	
30			24	66	24 TON	30					
40			24	66		40					
50			24	66		50					
11			24	66	5 OZ SIL.						
10			24	66		10					
20			24	66		20					
30			24	66		30					
40		X	24	66	27 TON	40					
50						50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 75 lbs.
		TRANSFER LADLES	Fe Si. 85% 150 lbs.
		38 PRIME 2 SPEC(?)	
			Cupola Tender ....

WPL 238

IRON CONTROL REPORT

DATE Feb 11/83

TIME	CUPOLA 8 Days. T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limes Test Bars, e.t.c.
7 00											R 200 Cok
10				0	30	322	186	384			5 sil.
20											
30	330	185	400	98	30	352	180	412			100 stone
40											200 coke R210
50					~~20~~	~~3[illegible]~~	~~1[illegible]~~				
8 00	334	183	415	0	30	367	177	426			
10						356	179	416			
20	343	172	402	0	20	360	179	420	347-181-407		?R4BRU
30											100 stone
40	352	173	410	0	24	349	177	408	339-179-399		floor?
50											
9 00	330	178	389	98	4	344	179	404			200 coke
10											
20	325	176	387	98	4	344	183	405			200 coke
30											
40						335	182	396			
50	319	172	378	98	4	334	180	384			200 coke
10 00											
10	332	165	387	98	30	340	179	400			100 stone
20											
30	340	175	398	98	30	344	176	403			
40					52	348	172	405 / 400TB	341 / 185	403	200TB
50											200 coke
11 00	333	183	396	98	30	336	178	395			
10						345	185	407	200 From Floor.		
20	347	178	406	98	30	345	174	403			100 stone
30											
40	344	190	407	98	26	348	182	409			
50	335	183	399	98	26	348	178	407			200 coke
12 00											
10											
20											
30				98	26	351	177	410			
40	327	164	382								200 coke
50						346	184	407			
1 00	330	173	388	98	26						
10						346	183	407			
20											200 coke
30	342	186	404	98	26	350	180	410			
40											
50											200 coke
2 00						355	181	415			
10	345	183	406								
20						353	182	414			
30						350	184	411			
40											
50											
3 00											
10											
20											

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb - 11 - 83 MELTER Cupola #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 6:35	200	400/60	—	450	—	450	300	100	5	1
6:38										
6:40										
6:43										
6:45										
6:55										
6:58										
7:03	Full									
7:07										
7:11										
7:16										
7:20										
7:23										
7:26										
7:29										
7:33										
7:38		160			100 [illegible]					
7:40										
7:44										
7:47										
7:50										
7:53	Full									
7:55										
8:01										
8:04										
8:08										
8:11										
TOTALS 8:15		160			100 [illegible]					

TOTAL MELT ____________________ TOTAL COST ____________________

WPGL-262

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 11/83 MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

[illegible] Buckall

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
1 [illegible]	210	60	—	450	—	450	300	400	(4)	1
2 23										
3 27										
4 30										
5 32										
6 36										
7 37										
8 42										
9 4[illegible]										
10 4[illegible]	410			2 Coke						
11 53										
12 56										
13 [illegible]										
14 [illegible]										
15 7										
16 0	410				2 Coke					
17 3		2	(12) Carbide		working on Limestone					
18 17		2				Hopper of Cone [illegible]				
19 31		2				[illegible] Charge				
20 36		2								
21 39		2								
22 43		2								
23 46										
24 4[illegible]										
25 51										
26 54	410					2 Coke				
27 57										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 11/83 MELTER [illegible] #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charge 36	Coke	Limestone	Pig Iron	Sprues & Dolly Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 1003	210	60	—	450	—	450	300	400	4	1
1004										
1012		160			100 Stone					
1015										
1017										
1020	[illegible]									
1023	[illegible]									
1029										
1032										
1035										
1039	410				2 CoK					
1042										
1045										
1048										
1052										
1054										
1057										
1100	[illegible]									
1106										
1109		160			100 Stone					
1113										
1116										
1119										
1122	[illegible]									
1127										
1130										
1134	410		2 cr		coke					
TOTAL 1137										

TOTAL MELT ________________ TOTAL COST ________________

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 11/83 MELTER [illegible] #3

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed			(35)							
1 1137	210	60		452		450	302	460	4	1
2 1142										
3 1145	Full		Shut Down							
1236										
1237										
1243	410	160			200 Coke		· 100 [illegible]			
1247										
1250										
1252										
1255										
1255										
12 1202										
13 1304	410				200 Coke					
14 1307										
15 1310										
16 1315										
17 1318	Full									
18 1325										
19 1327										
20 1330										
21 [illegible]										
22 [illegible]										
23 [illegible]										
24 [illegible]										
25 [illegible]										
26 [illegible]										
27 [illegible]										
TOTAL										

1/3

228

TOTAL MELT .... TOTAL COST ....

WPSL - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb - 11 - 83 MELTER Cupola #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed		400/60	—	450	—	450	300	400	5	1
6:35	200									
6:38										
6:40										
6:43										
6:45										
6:55										
6:57										
7:03	[illegible]									
7:07	[illegible]									
7:11										
7:16										
7:20										
7:23										
7:26										
7:29										
7:33										
7:38		100			100 [illegible]					
7:40										
7:44										
7:47										
7:50										
7:53	[illegible]									
7:55	[illegible]									
8:01										
8:04										
8:08										
8:11										
TOTALS 8:15		160			100 [illegible]					

TOTAL MELT ________________ TOTAL COST ________________

WPBL - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 11 /83 MELTER [illegible] #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

[illegible] Bucket [illegible]

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
1 [illegible]	210	60	—	450	—	450	300	400	(4)	1
2 23										
3 27										
4 30										
5 32										
6 36										
7 31										
8 42										
9 [illegible]										
10 [illegible]	410				[illegible]					
11 53										
12 56										
13 [illegible]										
14 [illegible]										
15 7										
16 0	410				[illegible]					
17 3		2	(12) Carbide			working on Limestone				
18 17		2				Hopper [illegible]				
19 31		2				[illegible] Charge				
20 36		2								
21 39		2								
22 43		2								
23 46										
24 48										
25 51										
26 54	410					[illegible]				
27 57										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 11/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 36.	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan Briqu- Red
Bed 1003	210	60	—	450	—	450	300	400	4	1
1009										
1012		160			100 Stone					
1015										
1017										
1020	Fill									
1023										
1029										
1032										
1035										
1039	410				260 R					
1042										
1045										
1048										
1052										
1054										
1057										
1100	400									
1106										
1109		160			180 Stone					
1113										
1116										
1119										
1122	400									
1127										
1130										
1134	410		2 cr		coke					
TOTAL 1137										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 11/83 MELTER Cupola #3

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
1 11:37	216	60		450		450	300	400	4	1
2 11:42										
3 11:45	Fill			Shut Down						
4 12:36										
5 12:37										
6 12:43	410	160			200 Coke		400 Iron			
7 12:47										
8 12:50										
9 12:52										
10 12:55										
11 12:55										
12 1:02										
13 1:04	410				200	Coke				
14 1:07										
15 1:10										
16 1:15										
17 1:18	Fill									
18 1:23										
19 1:27										
20 1:30										
21 [illegible]										
22 [illegible]										
23 [illegible]										
24 2:12										
25 2:15										
26 2:19										
27 2:21										
TOTAL 25										

113

228

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date FEB. 11/83 NIGHT SHIFT

Barometric Pressure N/A Dry Bulb Temperature 18 °F Wet Bulb Temperature N/A

Operating Conditions: 3" DIA. INSERTS

BLAST AIR TEMP. = 54 °F

O_2 Addition: -100 SCFM

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
16:00	9.0	1031	10.0	1220	9.0	-	8.0	-	2746	1.7	34	1	10.6	1.6	14.2
16:20	10.5	1184	10.0	1364	9.5	-	10.0	-	2853	1.7	34	4	8.6	3.4	13.
16:40	11.0	1238	12.0	1265	-	-	8.0	-	2858	-	-				
17:00	10.0	1166	9.5	1184	8.5	-	8.0	-	2856	1.7	36	2	11.0	1.0	14.2
17:20	10.5	1130	9.5	1211	8.5	-	9.0	-	2848	1.7	32	3	10.0	1.4	14.[illegible]
AVE.	10.2	1150	10.2	1248	8.9	-	8.6	-	2832	1.7	34.0	TOP	10.8	1.3	14.2
												BOTTOM	7.3	2.4	14.[illegible]
										BLAST AIR					

CUPOLA REPORT

CUPOLA No: 8 DATE: Feb 11/83 SHIFT: night

Bed –		Meltzone:	lb.
Sand:	lb.	Charges: 110	tons
Coke:	lb.	Poured:	tons
Lime:	lb.	Hours Melted:	hrs.
Start –		Tons per hour:	tons
Lit:	a.m.	Cupola Loss:	%
Charge:	a.m.	Coke Ratio: TO	
Blast:	a.m.	Weather:	
Tap:	a.m.	Humidity:	%
Slag:	a.m.	Temperature:	degrees F.
Stop –			
Charge: 11:10	p.m.		
Blast: 11:37	p.m.		
Drop: 11:51	p.m.		

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3					25 TON	8			16	66	
10	4t?					10			16	66	
20						20		X			Check lectrical for slag CH
30					Clean Water Jet	30					
40	X		18	66	Lime stone scale	40	40 min				
50			18	66	not working right	50					
4			18	66		9	X		15	66	
10			19	66		10			15	66	
20			19	66		20			15	66	
30			20	66		30			15	66	
40			19	66		40			15	66	
50			19	66		50			15	66	26 Ton.
5			17	66		10		X	15	64	
10			17	66		10			1		Cable broke on
20			17	66	23 Ton.	20					charge bucket
30			17	66		30	1 hr				
40		X	17	66	Clean Tuyeres	40	5 min				Lime stone bin
50	25 min					50					empty.
6	X					11					19 T
10			17	66		10	X		14	64	
20			17	66	Clean Water Jet	20			13	64	
30			17	66		30			9	64	
40			17	66		40					
50			17	66		50					
7			17	66		12					
10			16	66		10					
20			16	66		20					
30			16	66		30					
40			16	66	21 Ton.	40					
50			16	66		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 270 lbs.
		TRANSFER LADLES	Fe Si. 85% 260 lbs.
		Prime 23	Spear 4

Cupola Tender [signature]

WPL 238

a.

IRON CONTROL REPORT

Jim [illegible] [illegible]

DATE Feb. 11/67

TIME	CUPOLA #8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limestone Test Bars, e.t.c.
3 00											R 210 Coke
10						351	179	411	66		C 4 [illegible]
20											
30											
40				98	34						
50						349	180	409	66		
4 00	335	172	392	98	38						200 [illegible]
10						342	181	402	66		100 lb stone
20											
30	324	168	380	98	40						200 [illegible]
40						351	181	401	66		
50					44 12 oz	342	191	406	200 T Bar.		
5 00	327	181	391	98	37	345	183	406	66		200 [illegible]
10											
20						348	183	409	66		
30	329	188	392	98	32						100 stone
40						343	185	405	66		
50											
6 00											
10						348	177	407	66		200 [illegible]
20											
30	335	162	384	98	40 oz						
40						345	177	404	70		
50											
7 00	331	165	386	98	44	342	178	400	70		200 [illegible]
10											5 oil [illegible]
20						337	180	397	70		100 lb stone
30	318	179	378	98	44						
40						341	179	401	70		200 [illegible]
50											
8 00	324	178	393	98	44	341	181	401	66		R 220 Coke
10											[illegible]
20						343	180	403	66		
30											
40											
50						337	187	399	[illegible]		
9 00	30 not			98	40						
10	[illegible]	very low				334	185	401	66		200 Coke
20	320	178	379	98	44						
30						333	180	393	70		100 lb stone
40											200 Coke
50	305	171	362	98	44	339	182	400	66		
10 00						341	178	400	70		
10	312	199	369	98	34	338	182	399	66		
20						~~344~~	~~182~~				
30						338	182	399	66		
40											
50						340	183	401	66		
11 00											
10						338	184	397	66		
20						343	181	403	66		
30						340	178	399	70		
40						335	175	393			
50											
12 00											
10											
20											
30											
40											
50											
1 00											
10											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Feb 11 /83 MELTER [illegible] #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed		60	—	450	—	450	300	400	4	1
3 41	210									
3 44										
3 47										
3 50										
3 53		full								
3 57										
4 01										
4 04	4/10		200	extra	Coke					
4 07										
4 10										
4 13	full									
4 16		160		extra						
4 22										
4 25										
4 28										
4 31										
4 34										
4 37	4/10		200	extra	Coke					
4 40										
4 45										
4 48										
4 51										
4 54	4/10		200	extra	Coke					
4 57		full								
5 00										
5 05										
5 08										
5 10										

TOTAL MELT ________ TOTAL COST ________

HPSL - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT 2

DATE Feb - 11 - 83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges -23	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquets Red
Bed 5 1 14	210	60	–	450	–	250	300	400	4	1
5 2 17			(22)							
5 3 20										
5 4 23		60		extra						
5 5 26										
5 6 30										
5 7 34										
5 8 37										
5 9 41	Full									
6 10 4	410		200 extra limestone							
6 11 07										
6 12 10										
6 13 13										
6 14 16										
6 15 19										
6 16 22										
6 17 25										
6 18 28										
6 19 31										
6 20 34										
6 21 37										
6 22 40										
6 23 43										
6 24 46										
6 25 49										
6 26 52										
6 27 55										
6 TOTAL 58							Briquets	5		

TOTAL MELT .... TOTAL COST ....

WPSL - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Feb- 11-83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge -56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed										
701	210	60	-	450	-	450	300	400	5	1
704	410	200		extra	Coke					
707										
710		160		100 extra						
713										
715										
718										
721		Full								
724										
7029										
7132	410			200	Coke					
7235										
7338										
7441										
7544										
7646										
7749										
752										
7155										
7058										
801	410			200	extra Coke					
804										
807										
809										
811										
814										
817										
TOTAL 821										

TOTAL MELT .... TOTAL COST ....

WPBL - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT [illegible]

DATE 26-11-83 MELTER [illegible]

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charge	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
[illegible]										
[illegible]	210	60	-	450	-	450	300	480	5	1
[illegible]	210			200 Coke						
[illegible]										
[illegible]										
[illegible]										
[illegible]		100		100	extra					
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]	410		200	2 extra Coke						
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
[illegible]										
27										
TOTAL										

110

TOTAL MELT .... TOTAL COST ....

HPBL - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date FEB. 17/83 MORNING SHIFT

Barometric Pressure 29.1"Hg Dry Bulb Temperature 37°F Wet Bulb Temperature —

Operating Conditions: 3" DIA. INSERTS

O_2 Addition: 100 SCFM BLAST AIR TEMP = 70°F

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
9:40	9.5	1166	13.5	1004	9.5	–	10.0	–	2811	1.7	43				
10:00	14.0	1125	10.5	959	9.5	–	11.0	–	2763	1.7	45	2 3	12.6 8.9	10.4 13.7	1.0 0.8
10:20	10.5	1274	11.5	936	11.5	–	10.0	–	2825	1.8	45½				
10:40	10.5	1222	10.5	1006	9.5	–	11.5	–	2817	1.7	46				
11:00	11.5	1067	12.0	1157	9.5	–	9.5	–	2810	1.7	47				
11:20	9.5	842	10.0	1139	10.0	–	10.5	–	2808	1.7	48	1 4	11.8 12.0	6.8 10.2	4.0 2.0
AVE.	10.9	1116	11.3	1034	9.9	–	10.4	–	2806	1.72	45.8	TOP BOTTOM	12.2 10.5	8.6 12.0	2.5 1.4

BLAST AIR = 6655 SCFM

CUPOLA REPORT

CUPOLA No: 8 DATE: Feb. 17/83 SHIFT: Days

Bed – 64"
Sand: ..... lb. O2 on all day
Coke: 5500 lb. 35 x 1"
Lime: 400 lb.

Start –
Lit: ..... a.m. 35 x 4"
Charge: ..... a.m.
Blast: 6:53 a.m. 4 bites helspot
Tap: 7:06 a.m.
Slag: 7:36 a.m.

Stop –
Charge: ..... p.m. 12 cans carbide
Blast: ..... p.m.
Drop: ..... p.m.

Meltzona: 6000 lb.
Charges: 112 tons
Poured: ..... tons
Hours Melted: ..... hrs.
Tons per hour: ..... tons
Cupola Loss: ..... %
Coke Ratio: ..... TO
Weather: .....
Humidity: ..... %
Temperature: ..... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			25	68		12					
10			26	65	21 TON	10	1 hr.				
20			27	63	Clean Water Jets	20	5 min				
30			27	63		30					
40		X			Crane Down.	40	X				
50	X 10 min					50			25	67	
8			26	65	27 TON	1			25	67	
10			26	65		10			25	67	
20		X				20			25	67	8 oz sil.
30	20 min					30			25	66	
40	X		23	65	22 TON	40			25	66	22 TON
50			23	65		50			25	66	
9			24	65	6 oz sil.	2			25	66	
10		X	24	65	29 TON	10			25	67	
20	25					20		X	25	67	
30	min					30	15 min				25 TON
40	X		23	65		40	X				Clean Water Jets
50			25	67		50	min X				
10			25	66		3	20 min				
10			24	65		10					
20			24	67		20					
30			26	67		30					
40			26	67		40					
50			26	67		50					
11			25	66							
10			25	66		10					
20			25	67		20					
30			25	66		30					
40		X	25	65	26 TON	40					
50						50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 160 lbs
		TRANSFER LADLES	Fe Si. 85% 260 lbs
		Prime 70 Speller 3 A65R-1	
		Cupola Tender [signature]	

WPL 238

IRON CONTROL REPORT

[illegible]

DATE Feb. 17/83

TIME	CUPOLA # 8 T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limest. Test Bars, e.t.c.
7 00											F. 200. [illegible]
10											R. 5 [illegible]
20				—	34	345	179	405			
30	419	183	480	—	34	364	182	425	Not Coming		
40						374	187	436			
50						373	185	435			
8 00	328	173	386	—	28	378	187	440			100 lb stee[illegible]
10						355	180	415	66		
20						345	178	404	70		
30						343	176	402	70		
40				98	34	339	192	403	200 T Bar		200 [illegible]
50						347	176	406	400 T Bar		
9 00	341	172	398	98	38	351	178	410	70		100 lb [illegible]
10											
20											
30											
40				98	38	348	176	407	70		100 lb stee[illegible]
50	337	177	388	98	42						
10 00						340	179	400	70		200 [illegible]
10											
20	317	168	379	98	48	343	175	401	70		200 [illegible]
30											R. 6 [illegible]
40						347	176	406	70		
50	343	193	407	98	36						
11 00						347	179	407	70		
10											
20	333	188	396	98	32	346	179	406	70		200 [illegible]
30											
40						336	179	396	70		
50											
12 00											
10											
20											
30											
40						340	183	401	66		
50											200 [illegible]
1 00	328	176	387	98	36	340	183	401	66		
10											200 [illegible]
20						342	179	402	70		
30	314	188	377	98	36						
40						339	184	400	66		200 [illegible]
50											
2 00	327	179	387	98	36.						R 220 [illegible]
10						341	185	403	66		100 lb [illegible]
20											
30						366	189	429	Not Coming		
40				—	—	370	186	432			
50				—	—	373	188	426			
3 00						359	189	422			
10											
20											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb 17/43 MELTER #8

Wind On ______ A.M. Furnace Dropped ______ P.M. Pressure ______ Ounces Volume ______ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	200	60		475		425	300	400	5	1
6 1 37										
6 2 42										
6 3 45										
6 4 48										
7 5 00										
7 6 03	Full									
7 7 05										
7 8 12										
7 9 15										
7 10 19										
7 11 21										
7 12 24	Full									
7 13 28										
7 14 32										
7 15 35										
7 16 49										
7 17 51										
7 18 54										
7 19 57										
8 20 00				100 Extra 100 of Stone						
8 21 07		160								
8 22 06										
8 23 08										
8 24 12										
8 25 16										
8 26 41										
8 27 44	400			200 Extra 200 of Coke						
TOTAL 47										

112

TOTAL MELT ______ TOTAL COST ______

WPBL - 292

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE 7-6-17/83 MELTER #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	200									
1 (7 50)		60		475		425	300	400	5	1
2 (8 53)										
3 (8 56)										
4 (9 00)										
5 (9 03)				100 Extra lbs of Stone						
6 (9 06)										
7 (9 08)										
8 (9 38)										
9 (9 41)		60		100 Extra lbs of Stone						
10 (9 44)										
11 (9 47)										
12 (9 50)										
13 (9 53)	~~[illegible]~~			200 Extra lbs of Coke						
14 (9 56)	400									
15 (9 59)										
16 (10 02)	Full									
17 (10 07)										
18 (10 10)										
19 (10 13)										
20 (10 16)										
21 (10 19)				Running to Set						
22 (10 23)	400			200 Extra lbs of Coke					6	
23 (10 26)										
24 (10 28)										
25 (10 31)										
26 (10 34)										
27 (10 36)										
TOTAL (10 39)										

TOTAL MELT .... TOTAL COST ....

WPSL - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb-17/87 MELTER #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	User Briquets Metallic	Manganese Briquets Red
Bed	200									
10 1 43	Full	60		475.		425.	300	400	6.	1
10 2 47										
10 3 51										
10 4 57										
10 5 59										
11 6 02										
11 7 05										
11 8 07										
11 9 10										
11 10 13										
11 11 15										
11 12 18										
11 13 22	400			200 Extra lbs of Coke						
11 14 25										
11 15 28										
11 16 31										
11 17 34										
11 18 37										
11 19 40										
12 20 45		add 2 Cans of Carbide to next 6 Charges.								
12 21 48	400		200 Extra Coke on							
12 22 51										
12 23 54										
12 24 57										
1 25 00										
1 26 03	400		200 Extra lbs of Coke							
1 27 05										
TOTAL	[illegible]									

TOTAL MELT .... TOTAL COST ....

WPSL-052

X

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Feb. 17/83 MELTER #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 8-1	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan Brique Red
Bed	[illegible]	60		475		425	300	400	6	1
1 1 11										
1 2 14										
1 3 17	Full									
1 4 20										
1 5 25										
1 6 28										
1 7 30	400	=4		200 Extra lbs of Coke						
1 8 35										
1 9 38										
1 10 41	Full									
1 11 47										
1 12 50	[illegible]									
1 13 56	220			Running 220 Coke						
2 14 0										
2 15 03										
2 16 06										
2 17 09										
2 18 11		160		100 Extra lbs of limestone						
2 19 14										
2 20 17										
2 21 20					112					
2 22 22										
2 23 35										
2 24 38										
2 25 41										
2 24 45										
2 22 48										
2 TOTAL 51										

= Shift change

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date FEB. 17/83 NIGHT SHIFT

Barometric Pressure 29.1" Hg Dry Bulb Temperature 36 °F Wet Bulb Temperature N/A

Operating Conditions: 3" DIA. INSERTS

O_2 Addition: 100 SCFM

BLAST AIR TEMP. = 70 °F

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp Δ °F	% CO_2	Temp Δ °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
15:20	11.5	1242	11.0	1076	12.0	–	11.5	–	2808	1.70	40				
15:40	10.5	1260	10.0	1130	10.0	–	9.5	–	2852	1.75	41	#1 #4	10.7 10.4	13.5 14.6	0.5 0.9
16:00	9.0	1162	8.5	1144	8.0	–	8.5	–	2869	1.70	43				
16:20	9.5	1056	–	1301	–	–	8.0	–	2848	1.70	41½				
16:40	10.0	1085	8.5	1215	8.0	–	9.0	–	2818	1.70	39				
17:00	9.0	1159	8.5	1173	6.5	–	7.0	–	2831	1.70	39½				
AVE.	9.9	1161	9.3	1173	8.9	–	8.9	–	2838	1.71	40.7	TOP BOTTOM	10.7 10.4	13.5 14.6	0.5 0.9

CUPOLA REPORT

CUPOLA No: (8) DATE Feb 17/83 SHIFT Night

Bed –		O2 on 60 ALL NIGHT	Meltzone: ... lb.
Sand: ... lb.		NO CAL CARBIDE	Charges: 84 tons
Coke: ... lb.		13 BOXS HELSPOT	Poured: ... tons
Lime: ... lb.			Hours Melted: ... hrs.
Start –		Cupola Empty	Tons per hour: ... tons
Lit: ... a.m.			Cupola Loss: ... %
Charge: ... a.m.			Coke Ratio: ... TO
Blast: ... a.m.			Weather: ...
Tap: ... a.m.			Humidity: ... %
Slag: ... a.m.			Temperature: ... degrees F.
Stop –			
Charge: 10 – – – p.m.			
Blast: 10 30 p.m.			
Drop: 10 40 p.m.			

CHECKED FURNACE OK. FOR SLAG - 8" Jacket.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
3	(5)	X			23 TON	8		X	20	66	28 TON
10	X		22	65	6 oz SIL.	10					
20			22	65		20					
30			22	66		30					
40			22	66		40	(65)				
50			23	66		50					
4			23	66		9					
10			23	66		10	X		18	66	
20			22	66	4 oz SIL	20			18	66	8 oz SIL.
30			22	66		30			18	66	
40			22	66		40			18	66	
50			20	66		50			18	66	
5			20	66		10			18	66	
10		X	20	66	28 TON	10			16	64	
20						20		X	12	64	~~[illegible]~~ EASY UP.
30						30					FAN OFF. NO WATER
40						40					
50			60			50					
6						11					
10	X		18	66	7 oz SIL	10					
20			18	66		20					
30			18	66		30					12 Ton.
40			20	66		40					
50			20	66		50					
7			20	66		12					
10			20	66		10					
20			20	66		20					
30			20	66		30					
40			20	66		40					13 TON
50			20	66		50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 250 lbs.
		TRANSFER LADLES	Fe Si. 85% 175 lbs.
		32 Prim 3 spar	
		1/2 Bag 465 R	Cupola Tender Ken

WPL 338

(S) Ham

IRON CONTROL REPORT

DATE Feb. 17/83

TIME	CUPOLA T.C.	CUPOLA Si	CUPOLA C.E.	CUPOLA Graphite Dial	CUPOLA Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	400 IRON Si	400 IRON C.E.	200 IRON Silicon Add	200 IRON Graphite Add	REMARKS Temp., Coke, Lime Test Bars, etc.
3 00				98	34	345	184	406.			D220 COKE 4BRIQUES
10											200 Coke
20	325	175	383	98	34	347	180	407			
30											
40	327	178	386	98	34	333	183	394			200 COKE
50											
4 00	316	181	377	98	34	331	182	392			200 Coke
10	337	199	404	98	34	342	197	408	200 [illegible]		
20				98	30	337	193	401			100 Stone
30											
40	335	183	396	98	30	337	186	399			200 COKE
50											
5 00	326	167	380	98	30	335	184	396			
10					34						
20	327	163	350	98	46	343	182	404			200 Coke
30	[illegible]					340	186	402	200 TB		
40						338	176	397			
50											
6 00						343	184	404			
10				98	40						
20	316	174	374	98	40	343	185	405			200 COKE
30											
40	323	172	380	98	40	340	182	401			100 Stone 200 COKE
50											
7 00	—	—	387	98	40	344	187	407			
10											
20	331	181	391	98	40	385	193	409			
30						353	186	417			100 Stone
40	332	171	389	98	40	348	185	410			200 COKE
50											
8 00	325	178	384	98	40	344	184	405			
10						342	178	401			200 COKE
20											
30											
40											
50											
9 00						353	175	411			200 COKE
10	327	157	378	98	42						
20						349	182	410			100 Stone
30											
40	339	188	402	98	42	351	172	408			
50											
10 00	339	178	398	98	42	346	181	406			
10											
20	327	188	390	98	40						
30						344	177	403.			
40						341	182	402			
50						346	178	406			
11 00						341	191	405	200 flex		
10						352	181	412			
20						344	[illegible]	405			

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #[illegible]

DATE Feb 17/83 MELTER Cupola #8

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangano. Briquet Red
Bed	220	60		475	1	425	300	400	4	1
2:55										
3:05										
3:11	420				Zero	Coke				
3:18										
3:21										
3:25										
3:29										
3:33										
3:36										
3:39	420				Zero	Coke				
3:44										
3:48										
3:51									112	
3:55	420				Zero	Coke			84	
3:58	Full								196	
4:05										
4:09										
4:12										
4:17										
4:20										
4:25										
4:29	420	160			200	Coke	100	Stone		
4:33										
4:35										
4:40										
4:43										
4:46										
4:50										

TOTAL MELT ________ TOTAL COST ________

WPGL - 202

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #2

DATE Feb 17/83 MELTER cupola #1

Wind On ________ A.M. Furnace Dropped ________ P.M. Pressure ________ Ounces Volume ________ C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprue & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed 453	220	60		475		425	300	400	4	1
456										
501										
505										
5 3 09										
5 4 13										
5 7 17	420	[illegible]		200	Coke		Shift	Down		
[illegible]09										
[illegible]08										
6 10 11										
6 11 14										
6 12 17										
6 13 19										
6 14 23		[illegible]								
6 15 27	420	[illegible]			200	Coke				
6 16 32										
6 17 36		160			100 Stone					
6 18 39										
6 19 [illegible]4										
6 20 47	420				200	Coke				
6 21 50										
6 22 53										
6 23 56										
6 24 59										
7 25 02										
7 26 06	Full									
7 27 12										
7 [illegible]		160			150 Stone					

TOTAL MELT ________ TOTAL COST ________

WPBL - 252

KELSEY-HAYES CANADA LIMITED

WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT 7 [illegible]

DATE [illegible]/63 MELTER [illegible]

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed 7[illegible]	220	[illegible]00		275		425	300	400	4	1
722										
726										
[illegible]	220			200 Coke						
734										
737										
737										
743										
745										
10 [illegible]	[illegible]	Shut		Down	200 Coke					
11 [illegible]	420				200 Coke					
12 773										
13 775	420			200 Coke						
14 [illegible]										
15 12										
16 15										
17 18										
18 21		[illegible]		[illegible]						
19 24										
20 [illegible]										
21 [illegible]										
22 36										
23 41										
24 44										
25 47										
26 49										
[illegible]										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

SECTION 'H': DATA SHEETS FOR GROUP VI TESTS
(TUYERE VELOCITY = 90 SFPS)

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date MAR 23/83 - MORNING

Barometric Pressure 29.5"Hg Dry Bulb Temperature 35°F Wet Bulb Temperature N/A

Operating Conditions: ALL DAMPERS OPEN
NO INSERTS, HALF OF EACH TUYERE OPENING BLANKED OFF
80 lb. LIMESTONE

O_2 Addition: 80 SCFM

BLAST AIR TEMPERATURE = 60°F

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. ΔP " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
9:00	10.0	1328	NA	NA	NA	–	7.0	–	2860	1.7	41.0				
9:20	11.5	1355	NA	NA	NA	–	11.5	–	2865	1.7	45.0				
9:40	14.0	1094	NA	NA	NA	–	12.5	–	–	–	–				
10:00	–	–	NA	NA	NA	–	–	–	–	–	–				
10:20	11.5	1202	NA	NA	NA	–	10.0	–	2812	1.7	35.5				
AVE.	11.8	1245	–	–	–	–	10.3	–	2846	1.7	40.5				

NOTES - PORTS 2,3 WERE PLUGGED ∴ NO SAMPLES COULD BE TAKEN
- ORSAT APPARATUS WAS NOT FUNCTIONING

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date MAR. 23/83 - AFTERNOON

Barometric Pressure 29.5" Hg. Dry Bulb Temperature 35°F Wet Bulb Temperature N/A

Operating Conditions: ALL DAMPERS OPEN
NO INSERTS, HALF OF EACH TUYERE OPENING BLANKED OFF
80 lb. LIMESTONE

O_2 Addition: 80 SCFM

BLAST AIR TEMPERATURE = 60°F

Time	Port #1		Port #2		Port #3		Port #4		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F				Port #	% CO_2	% CO	% O_2
12⁴⁰	10.0	1112	9.5	1112	8.0	–	–	–	2842	1.7	32.5				
1⁰⁰	9.0	1089	9.0	1409	–	–	8.0	–	2819	1.7	34.5				
1²⁰	7.0	1130	8.0	1355	7.0	–	–	–	–	1.8	32.5				
1⁴⁰	BLOWER OFF				–	–	–	–	–	–	–				
2¹⁰	8.5	1076	7.5	1220	9.0	–	–	–	2830	1.6	25.0				
AVE.	8.6	1102	8.5	1274	8.0	–	8.0	–	2830	1.7	31.1				

NOTE: ORSAT APPARATUS WAS NOT FUNCTIONING

CUPOLA REPORT

CUPOLA No: 8 DATE: March 23/83 SHIFT: 1

Bed – 63"

Sand: .... lb. ~~No cal carbide~~

Coke: 6000. .... lb. 4.5-9" 401" LADLES HELSTED

Lime: 400. .... lb. NO cal-carbide

02 on 8c ALL DAY

Start –

Lit: .... a.m.

Charge: .... a.m.

Blast: 6:52 a.m.

Tap: .... a.m.

Slag: 7:37 a.m.

Stop –

Charge: .... p.m.

Blast: .... p.m.

Drop: .... p.m.

7 BOXS FOR LADLES

Meltzona: 8000 lb.

Charges: 114 tons

Poured: .... tons

Hours Melted: .... hrs

Tons per hour: .... tons

Cupola Loss: .... %

Coke Ratio: .... TO

Weather: ....

Humidity: .... %

Temperature: .... degrees F

~~Bre~~ Breast Hole blowing

Time	On	Off	Oz.	CFM	Reasons for Off
7			25	70	16 Ton.
10			23	62	
20			24	62	Clean Water Jets
30			24	62	12 oz 3
40	5X				long trough
50			24	62	leaking.
8	X				Repair inside by
10	25 min				trough
20	X		20	62	Cap up.
30			20	62	
40			20	62	
50			20	62	4 oz SIL
9			24	65	16 TON
10			24	65	
20			24	65	
30			24	65	
40			24	65	
50			23	65	
10			23	65	
10			21	65	
20			20	63	
30			18	63	
40			18	66	
50			18	66	
11			18	66	
10			18	66	
20			18	66	
30			18	66	
40			18	66	
50		X	18	66	

Time	On	Off	Oz.	CFM	Reasons for Off
12					
10					
20		40			
30	X		15	67	
40			15	66	
50			15	66	
1			17	66	
10			17	66	
20			17	64	
		X	17	66	28 TON
40	20 min				
50					tuyers OK
2	X		14	61	~~[struck out]~~
10			14	61	
20		X	14	61	26 TON
30					
40					
50	40 min				
3					87.2
10					14.93
20					
30					
40					
50					
10					
20					
30					
40					
50					

Type of Drum	Cans of Alloy			
		SPOUT	Fe Si. 85% 160	lbs.
		TRANSFER LADLES	Fe Si. 85% 240	lbs.

Prim 28 Spec A6 A65h-1

Cupola Tender [signature]

WPL 236

[illegible] [illegible]

...ON CONTROL REF ORT

DATE March 23/8

TIME	CUPOLA 8 Days T.C.	Si	C.E.	Graphite Dial	Silicon Dial	LECTRO MELT - FURNACE 400 IRON T.C.	Si	C.E.	200 IRON Silicon Add	Graphite Add	REMARKS Temp., Coke, Limes Test Bars, e.t.c.
7 00											R 170 Coke
10	2963	TEMP		7:20 [illegible]	36						8 sil
20	415	165	420	—	36	337	174	393			
30		do not use				343	17.3	401	20		
40						351	178	408	20		
50	336	198	399	98	38						R. 2 [illegible]
8 00						340	176	399	30		
10											
20						340	177	399	20		
30	303	190	366	98	30						[illegible]
40						343	189	406	60		[illegible]
50	318	194	383	98	20						
9 00						347	187	409	66		R.S. BRIQUET
10	328	198	393			345	186	407	4 out Bar		
20				98	20	349	198	415	200 + Bar		
30	334	184	395								
40		2830	TEMP			341	183	402	66		
50											
10 00	318	165	373	98	38	337	182	397	66		[illegible]
10											
20						335	183	396	66		
30	313	191	377	98	34						[illegible]
40						339	186	401	66		
50											
11 00	320	188	383	98	32						
10						343	187	405	66		
20											
30	321	176	380	98	36	345	185	407	66		
40											
50	334	170	391	98	36	347	183	408	66		
12 00											
10											
20											
30											R 210 COKE
40						339	192	401	66		[illegible]
50											
1 00	312	180	372	98	36	337	185	399	66		[illegible]
10											
20											
30	307	189	370	98	32	341	190	404	50		[illegible]
40						347	280	414	6200 - EUCO.		
50	318	186	377								
2 00											
10				98	24	337	191	401	50		
20	320	176	379	98	32						
30											
40						338	187	400	66		
50											
3 00											
10											
20											
30											
40											
50											
00											
10											
20											
30											
40											
50											
00											
10											

8

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar. 23/83 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangano Briquet Red
Bed	14C	80		475		475	700	400	5	1
6 1 43										
6 2 46										
6 3 49										
6 4 51										
6 5 54										
6 6 57	Full									
7 7 02	Full									
7 8 11										
7 9 15										
7 10 18										
7 11 21	Full									
7 12 28										
7 13 31										
7 14 34										
7 15 36										
7 16 39										
7 17 43										
7 18 46										
7 19 53	Full									
7 20 59	380.			200 Coke on						
8 21 02										
8 22 12										
8 23 16										
8 24 19										
8 25 22	Full									
8 26 25										
8 27 33	390			200 Coke on						
8 TOTAL 36										

114

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar. 23/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangane Briquet Red
Bed	190	80		475		425	300	400	6	1
8 1 39										
8 2 43										
8 3 46		180		100	Stone.					
8 4 49										
8 5 53										
8 6 56										
9 7 00										
9 8 03										
9 9 06										
9 10 09										
9 11 12.									(.5)	
9 12 15	R.	.5	Silk							
9 13 20										
9 14 24										
9 15 28										
9 16 31										
9 17 34										
9 18 37										
9 19 40										
9 20 43										
9 21 46										
9 22 49										
9 23 52										
9 24 54										
9 25 57										
10 26 00										
10 27 04	Full									
10 TOTAL 0	340			200 lbs of Coke on						

TOTAL MELT .... TOTAL COST ....

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mon 23/43 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed	890									
10 1 13		80		475		425	300	400	5	1
10 2 16										
10 3 19										
10 4 22										
10 5 25										
10 6 28										
10 7 32	390			200 lbs of Coke on						
10 8 37										
10 9 40										
10 10 47										
10 11 50										
10 12 53										
10 13 56										
10 14 58										
11 15 01										
11 16 04										
11 17 08										
11 18 11	Full									
11 19 16										
11 20 20										
11 21 23										
11 22 26										
11 23 29										
11 24 32										
11 25 35										
11 26 38										
11 27 41										
11 TOTAL 44										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar. 23/83 MELTER Cupola # 8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	190.									
11 1 47	210	80		475		425	300	400	5	1
11 2 50.			R. 210 lbs of Coke							
11 3 52										
11 4 55	//									
12 5 27										
12 6 30										
12 7 32										
12 8 35										
12 9 39										
12 10 43										
12 11 45.										
12 12 48	[illegible]	180		100 lbs of Stone on						
12 13 50	X									
12 14 53	Full									
12 15 58										
1 16 01										
1 17 05	410.			200 lbs of Stone on						
1 18 09										
1 19 13										
1 20 16										
1 21 19										
1 22 22										
1 23 25	410			200 lbs of Coke on						
2 24 02										
2 25 05										
2 26 08										
2 27 12										
2 TOTAL 15	—									

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar. 23/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 112	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangane Briquet Red
Bed	210									
2:18		80		475		425	300	400	5	1
2:21										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

HATCH ASSOCIATES CONSULTING ENGINEERS	CALCULATION SHEET	SHEET NO. ...... OF ......

DESCRIPTION	PROJ. NO.	MADE BY / DATE	CHECKED BY / DATE

Mar 23

	e	l
op hrs	4.83 − 0.5	1.83 − 0.5
Metal ch.	70.4	20.8
Coke ch.	8.8	2.93
D/time hrs.	0.5	0.5

Mar. 25

e - D/time hrs = 0.0
op. hrs = 4.67
M/C = 7.62 Metal Ch. = 76.0
t/oph = 16.3 Coke Ch = 9.98 t.

l - D/time hrs = 0.25
op. hrs = 1.83 − .25 = 1.58
M/C = 7.57 Metal ch = 28.0 t.
t/oph = 17.7 Coke ch = 3.70 t.

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date MAR. 25/83 - MORNING

Barometric Pressure 29.7" Hg. Dry Bulb Temperature 45 °F Wet Bulb Temperature N/A

Operating Conditions: ALL DAMPERS OPEN
NO INSERTS, HALF OF EACH TUYERE OPENING BLANKED OFF
80 lb. LIMESTONE

O_2 Addition: 80 SCFM

BLAST AIR TEMPERATURE = 60 °F

ime	Port #1		Port #2		Port #3		% CO_2		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	PORT # 4	PORT # 5				Port #	% CO_2	% CO	% O_2
8:00	11.0	1031	9.0	1301	8.0	–	8.5	8.0	2876	1.7	42 1/2	2	11.2	18.6	0.0
8:20	9.5	1094	8.0	1148	–	–	8.0	8.5	2825	–	–	4	11.0	17.0	0.8
8:40	9.5	1265	7.5	1409	7.5	–	8.0	–	2815	1.7	51 1/2	3	10.0	20.4	0.0
9:00	10.0	1175	8.0	1366	8.0	–	10.0	11.0	2777	1.7	49 1/2				
9:20	–	1256	8.5	1202	7.0	–	7.0	8.5	2825	1.7	53 1/2	5	14.5	14.2	0.1
9:40	13.0	–	8.0	–	7.0	–	7.0	10.0	2836	–	–	1	12.2	16.4	0.0
10:00	8.5	–	8.5	–	–	–	8.0	12.0	2835	1.7	45 1/2				
10:20	–	1436	8.0	1544	7.5	–	7.0	9.5	2832	–	–	5	12.8	16.5	0.2
10:40	–	1184	–	–	7.0	–	9.0	9.0	2820	1.7	44 1/2	3	8.6	22.8	0.0
11:00	10.5	1562	7.0	1562	–	–	–	8.0	2836	1.7	42 1/2	4 1	10.6 13.0	17.6 14.4	0.4 0.2
AVE.	10.3	1250	8.1	1362	7.4	–	8.1	9.4	2828	1.7	47.1	1 2	12.6 11.2	17.0 18.6	0.1 0.0
												3 4	9.3 10.8	21.6 17.3	0.0 0.6
												5	13.7	15.4	0.1

HATCH ASSOCIATES LTD. Project #9003

KELSEY-HAYES CANADA DATA

Date MAR. 25/83 - AFTERNOON

Barometric Pressure 29.7" Hg. Dry Bulb Temperature 45°F Wet Bulb Temperature N/A

Operating Conditions: ALL DAMPERS OPEN
NO INSERTS, HALF OF EACH TUYERE OPENING BLANKED OFF
REVERSED CHARGING ORDER - COKE ON BOTTOM
80 lb. LIMESTONE

O_2 Addition: 80 SCFM

BLAST AIR TEMP. = 60°F

Time	Port #1		Port #2		Port #3		% CO_2		Metal Temp. °F	Orif. Δ P " WC	Stat. Pressure " WC	Orsat Analysis			
	% CO_2	Temp. °F	% CO_2	Temp. °F	% CO_2	Temp. °F	PORT #4	PORT #5				Port #	% CO_2	% CO	% O_2
12^{50}	9.5	914	8.0	1058	7.0	–	7.5	10.5	2819	1.7	45½	2	13.8	11.0	[illegible]
1^{10}	10.5	1112	8.5	1382	9.0	–	8.5	9.0	2802	1.7	42	5	13.8	13.4	[illegible]
1^{30}	10.0	1580	9.0	–	–	–	7.0	11.0	2812		–				
1^{45}		- BLOWER OFF									–	2	13.8	12.0	[illegible]
2^{10}	8.0	1526	7.0	1274	–	–	8.5	9.0	2805	1.7	39	4	12.4	13.2	[illegible]
2^{25}	–	–	8.5	–	7.5	–	8.0	8.0			–	1 4	13.0 11.9	13.0 12.9	[illegible] 0.7
AVE.	9.5	1283	8.2	1238	7.8	–	7.9	9.5	2810	1.7	42.2	1 2 4 5	13.0 13.8 12.1 13.8	13.0 11.5 13.0 13.4	[illegible] [illegible] 0.3 [illegible]

CUPOLA REPORT

CUPOLA No: 8 DATE: March 25/83 SHIFT: 1

Bed – 62"
Sand: .... lb.
Coke: 5800 lb.
Lime: 400. lb.

02 on all DAY – 80
~~??? ???~~
50-4' 45-1" 6 BOYS 44 SPCL
7 BOYS FOR LADLES

Start –
Lit: .... a.m.
Charge: .... a.m.
Blast: 6:51 a.m.
Tap: 7:04 a.m.
Slag: 7:35 a.m.

Stop –
Charge: .... p.m.
Blast: .... p.m.
Drop: .... p.m.

Meltzona: 7000 lb.
Charges: .... tons
Poured: .... tons
Hours Melted: .... hrs.
Tons per hour: .... tons
Cupola Loss: .... %
Coke Ratio: ....
TO
Weather: ....
Humidity: .... %
Temperature: .... degrees F.

Time	On	Off	Oz.	CFM	Reasons for Off	Time	On	Off	Oz.	CFM	Reasons for Off
7			24	69	14 Ton	12					
10			25	64	Clean Water Jets	10		60			
20			27	64		20		min			
30			27	64	R. 80 LBS Lime Stone	30					CHANGED CHARGE COKE [redacted] FR
40			27	64	4 oz SIL	40	X		22	64	
50			27	64		50			22	64	
8			27	64		1			24	64	
10			28	64		10			24	64	
20			28	64		20			22	64	
30			28	62		30			25	64	
40			28	72		40		X	25	64	24 TON
50			28	64		50					
9			28	64	19 TON	2	X	20	25	64	
10			28	64		10			21	64	
20			28	65		20			21	64	
30			26	65		30		X	21	64	Clean Water Jets
40			26	64		40					
50			28	64		50	30				
10			28	64	3 oz SIL	3	X				
10			26	63		10					
20			26	64		20					
30			24	64		30					
40			24	64		40					
50			24	64		50					
11			24	64							
10			25	64		10					
20			25	64		20					
30			24	64	25 TON	30					
40		X	24	64		40					
50					Clean Tuyeres	50					

Type of Drum	Cans of Alloy		
		SPOUT	Fe Si. 85% 100 lbs.
		TRANSFER LADLES	Fe Si. 85% 200 lbs.
		Prim 2-4 Spoor 4 A55R-1	

Cupola Tender [signature]

IRON CONTROL REPORT

[illegible]

DATE March 25/8[illegible]

CUPOLA #8 Days

TIME	Cupola T.C.	Cupola Si	Cupola C.E.	Graphite Dial	Silicon Dial	Lectro Melt - Furnace: 400 Iron T.C.	400 Iron Si	400 Iron C.E.	200 Iron Silicon Add	200 Iron Graphite Add	REMARKS (Temp., Coke, Limes, Test Bars, e.t.c.)
7 00											R 190 Coke
10				—	36						6 oil
20	2894 TEMP			—	40	337	170	394	80		
30	394	185	436	—	40	350	168	406	60		
40	343	192	407	80	36						R 80 Stone
50						349	176	408	20		[illegible]
8 00	327	179	383	98	36						[illegible]
10						344	177	403	20		[illegible]
20											
30	376	184	401	98	28	343	178	402	70		
40						348	192	412	200T Bar		
50						349	181	409	400T Bar		
9 00	324	184	385	98	28	342	181	402	70		200 COKE
10	2780 TEMP										
20	326	191	390	98	24	344	179	404	70		R5 ARI Quick
30											
40	316	192	380	99	20	341	183	402	66		100 Stone
50											
10 00						340	188	403	60		
10	330	181	380	98	20						
20						337	184	398	66		
30	325	181	385	98	24						
40						344	182	405	66		200 COKE [illegible]
50											
11 00	322	189	375	98	24						
10	2805 TEMP					342	186	404	66		
20											
30	327	187	389	98	20	339	185	401	66		[illegible]
40											
50						345	191	409	60		100 Stone
12 00											
10											
20											
30											
40						337	186	400	66		
50											
1 00	328	185	393	98	10	345	188	405	60		
10											no limestone
20						343	185	405	66		
30	313	179	373	98	20						
40						341	186	403	66		[illegible]
50											
2 00											
10					30	343	180	403	70		
20	312	176	371	98	38						
30	2785 TEMP					338	180	398	70		[illegible] FOR SHUT DOWN
40											
50											
3 00											
10											
20											
30											

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar. 25/87 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Mangan Brique Red
Bed	190									
6 1 42		80		475		425	300	400	6	1
6 2 45										
6 3 47										
6 4 50	Full									
6 5 36										
7 6 02	200	R	200 Coke							
7 7 05										
7 8 08										
7 9 11										
7 10 14										
7 11 17	Full									
7 12 22										
7 13 25										
7 14 28										
7 15 31										
7 16 34										
7 17 37										
7 18 40										
7 19 43										
7 20 46	Full	160								
7 21 52		[illegible]		100 lbs Stone on						
7 22 55										
7 23 58		R.	80. lbs of Stone							
8 24 01										
8 25 04	400			200 lbs of Coke on						
8 26 07										
8 27 10										
8 TOTAL 13										

130

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar 25/83 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 28.	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	200									
8 1 16		80.		475.		425	300	400	6	1
8 2 19										
8 3 22										
8 4 25										
8 5 28	Full.									
8 6 33										
8 7 36										
8 8 39										
8 9 43										
8 10 46										
8 11 48										
8 12 50										
8 13 54										
8 14 57										
9 15 00	400		200 lbs of Coke on							
9 16 03										
9 17 06										
9 18 09										
9 19 12										
9 20 15.										
9 21 18										
9 22 21		180		100 lbs of Stone on						
9 23 25		R.	5	Sil.					(5)	
9 24 28										
9 25 31										
9 26 34										
9 27 37										
9 TOTAL 40										

TOTAL MELT .... TOTAL COST ....

WPSL - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar 25/83 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 56	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed	200									
9:43		80		475		425	300	400	5	/
9:46										
9:49										
9:52										
9:55										
9:58										
10:01										
10:04										
10:07										
10:10										
10:13	Full.									
10:19										
10:22										
10:25										
10:28										
10:31										
10:34	400			200 lbs of Coke on						
10:37										
10:40										
10:43										
10:46										
10:49										
10:52										
10:55										
10:58										
11:01										
11:04										
TOTAL 11:07										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar 25/83 MELTER Cupola #8.

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 84	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquets Red
Bed	200									
11 1 10		80.		475		425	300	400	5	1
11 2 13										
11 3 16										
11 4 19										
11 5 22										
11 6 25										
11 7 28	400			200 lbs of Extra						
11 8 32										
11 9 35										
11 10 38										
11 11 41										
12 12 36		Coke in first								
12 13 39		180		100 lbs of Stone						
12 14 43										
12 15 45										
12 16 48										
12 17 51										
12 18 54										
12 19 57										
1 20 00										
1 21 03										
1 22 06										
1 23 09		~~[illegible]~~								
1 24 12										
1 25 15		180		100 lbs of Stone						
1 26 18										
1 27 21										
1 TOTAL 2[illegible]										

TOTAL MELT .... TOTAL COST ....

WP&L - 252

KELSEY-HAYES CANADA LIMITED
WOODSTOCK DIVISION

IRON FOUNDRY CHARGING SHEET

SHIFT #1

DATE Mar 25/83 MELTER Cupola #8

Wind On .... A.M. Furnace Dropped .... P.M. Pressure .... Ounces Volume .... C.F.M.

Charges 112	Coke	Limestone	Pig Iron	Sprues & Daily Scrap	Drop Iron	Hot Pressed Iron Briquets	Cast Iron Scrap	Steel Scrap	Ucar Briquets Metallic	Manganese Briquet Red
Bed	200									
1 1 26		80		475		425	300	400	5	1
1 2 29										
1 3 32										
1 4 35										
1 5 38										
1 6 40	400			200 lbs of Coke on						
1 7 43										
2 8 01	Full									
2 9 07										
2 10 09										
2 11 12										
2 12 16										
2 13 18										
2 14 21										
2 15 23	400		200 lbs of Coke on.							
2 16 26										
2 17 29										
2 18 31										
19										
20										
21										
22										
23										
24										
25										
26										
27										
TOTAL										

TOTAL MELT .... TOTAL COST ....

WP&L - 252